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The JOURNAL OF THE DEPARTMENT of AGRICULTURE

VICTORIA - AUSTRALIA

VOL. XXXI PART 7

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JULY, 1933 PRICE 3D.

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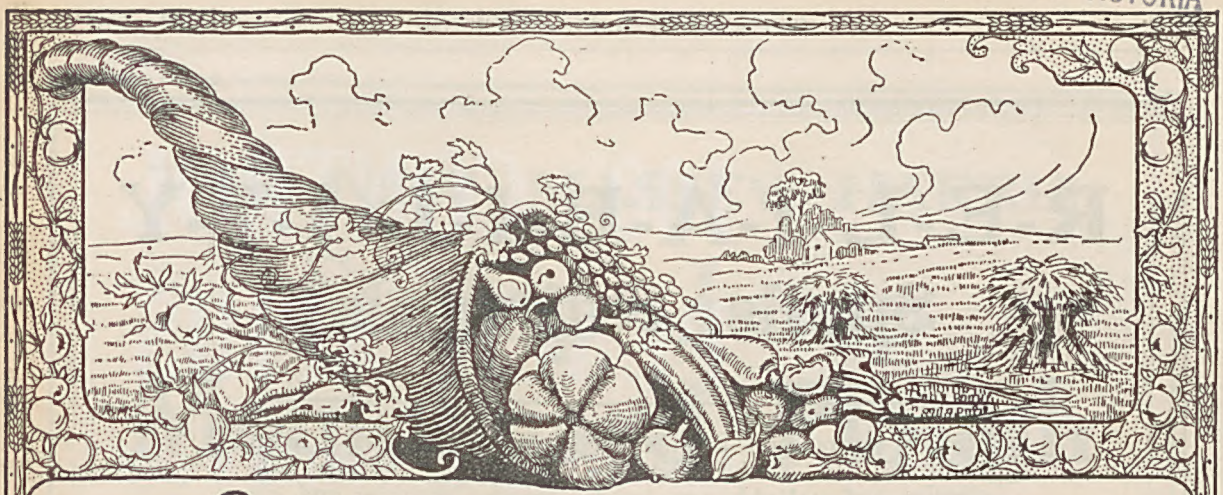

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Issued under the direction of the Hon. J. Allan, M.L.A., Minister of Agriculture.

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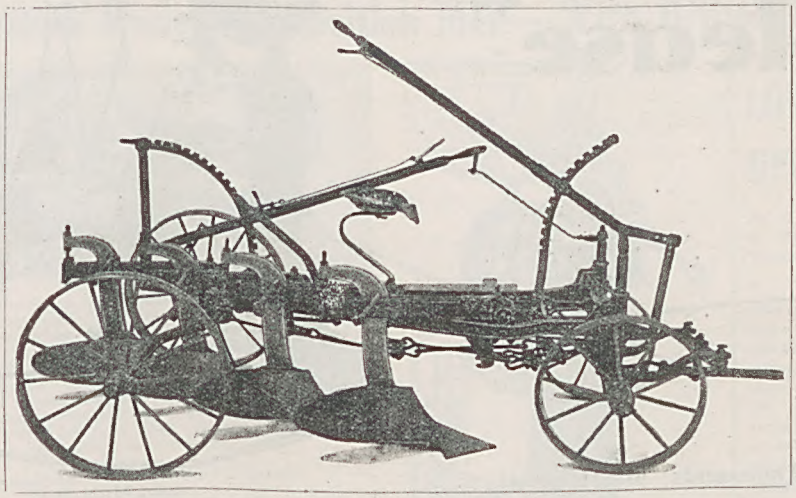

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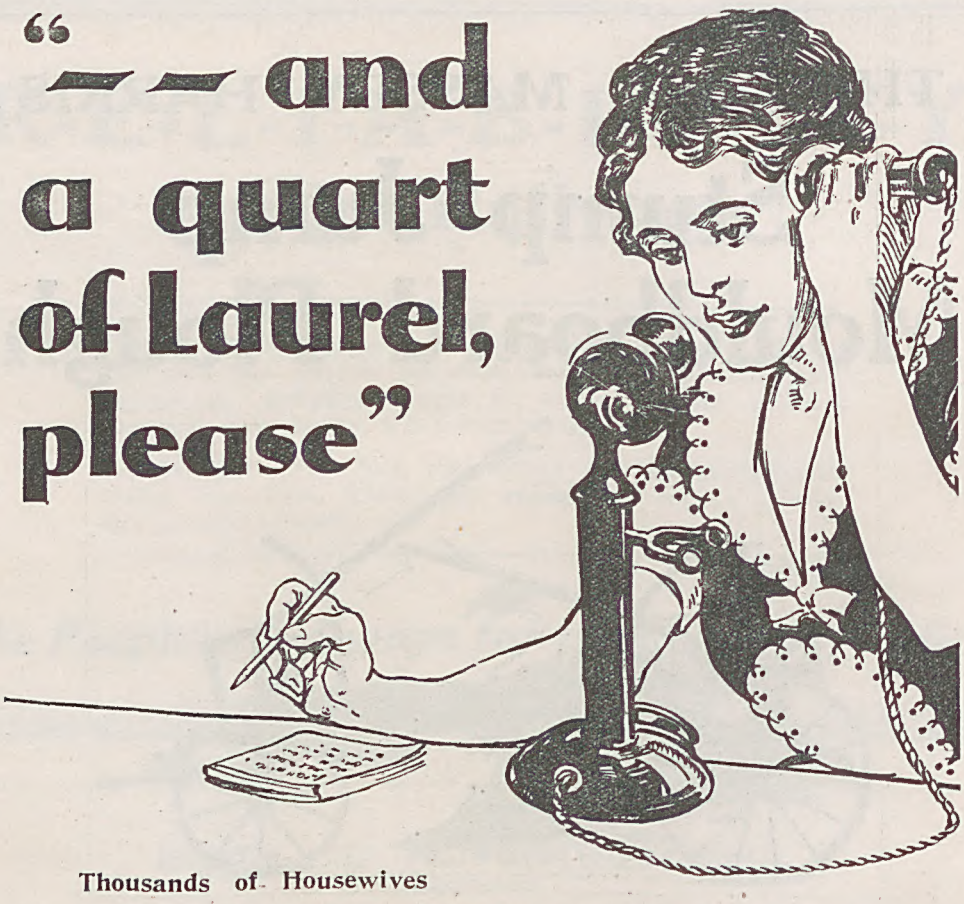

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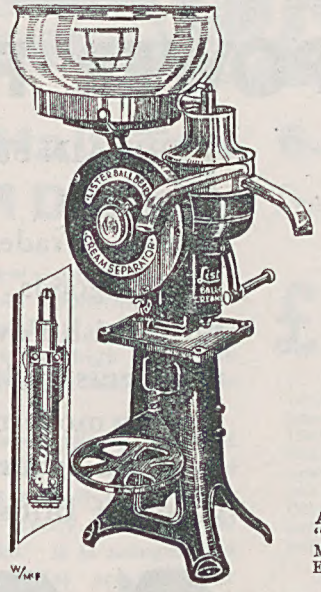

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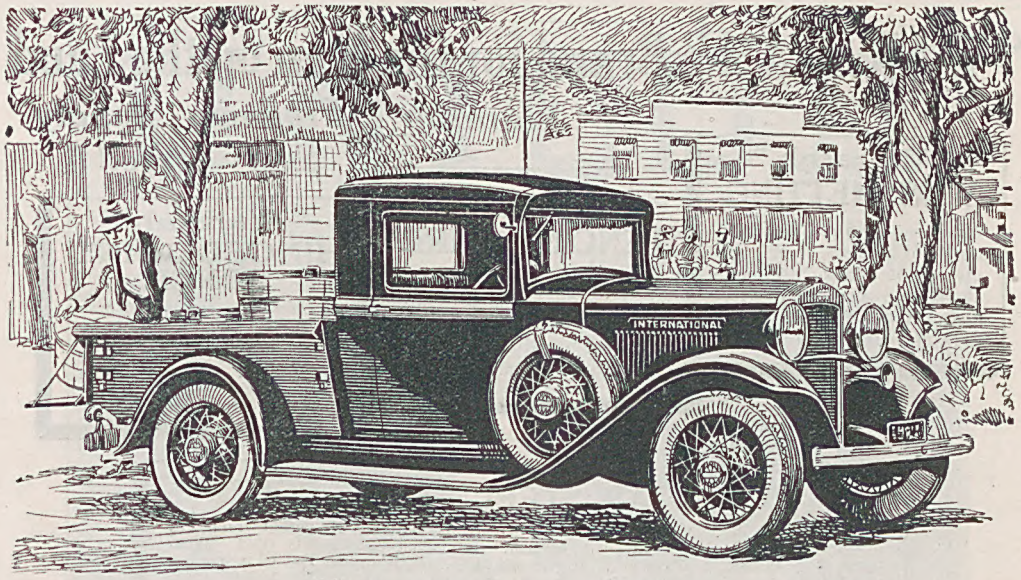

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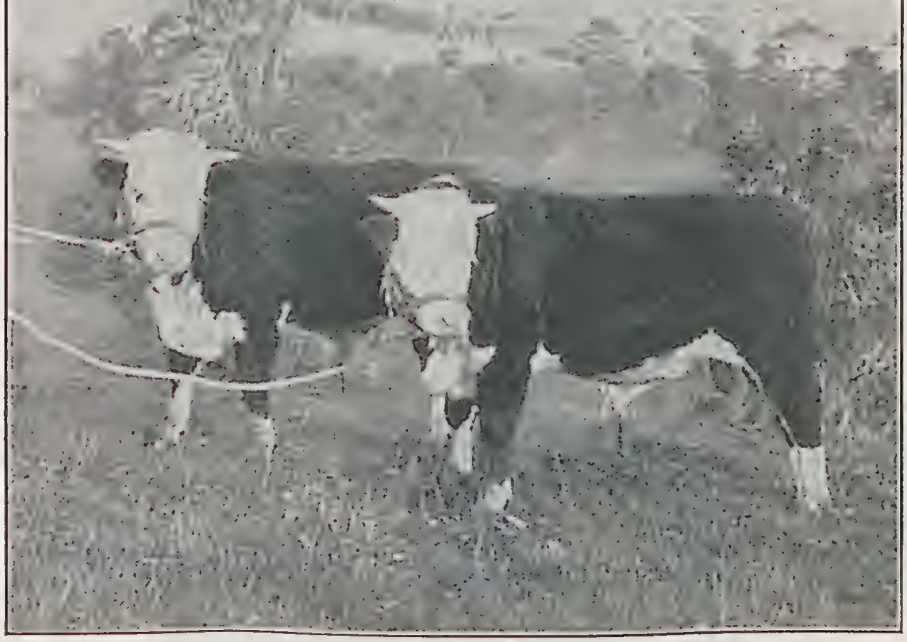

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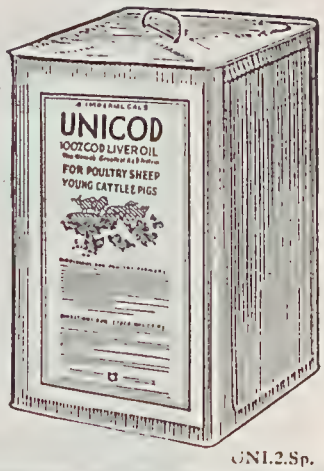

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The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

Common Pasture Grasses

THEIR IDENTIFICATION

By A. Morgan, B.Agr.Sc.

IN a previous article (*Journal of Agriculture*, March, 1932) the methods by which the common clovers and medicks could be identified, before flowering, were outlined, and it is proposed to deal now with the identification of the grasses which more commonly occur in irrigated sown-pastures in Victoria. Most of these may be easily recognized by their "seed-heads" or inflorescences, but, unfortunately, these are not always in evidence, and it is necessary to rely on other less conspicuous features.

Briefly, the grass plant consists of three parts—the roots, leaves, and seed-heads. The leaves are our main concern. On closer examination each leaf is found to consist of a lower portion adhering to the stem (the leaf-sheath) and an upper free portion (the leaf-blade). At the junction of these, on the inside, a small flap of transparent tissue known as the ligule is usually present, although in some cases it is either very minute (and, for all practical purposes, absent), or represented by a semi-circle of hairs. Traversing the leaf longitudinally are a varying number of veins, the central being known as the midrib. This comprises all the botanical knowledge necessary for our purpose—the relative positions of the blade, the sheath, the ligule, and the veins and midrib. Variations in these parts usually are sufficiently conspicuous to form the basis of a system of identification of the more common grasses. The presence or absence of hairs on the various parts of the plant is an important feature.

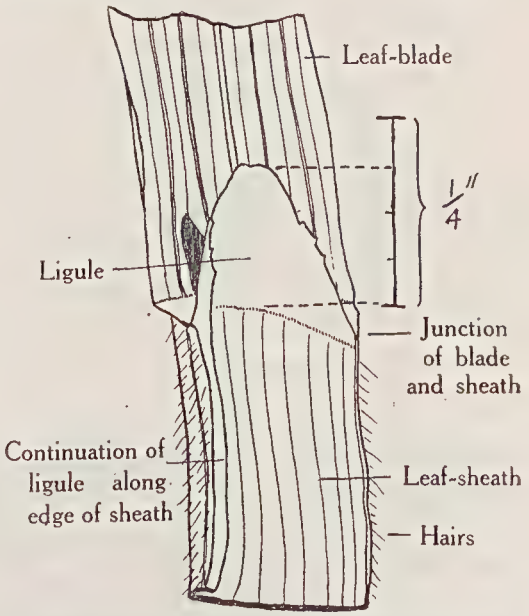


Diagram 1.—Showing the ligule of Prairie Grass, enlarged.

Hairless Grasses.

The more valuable pasture species—the rye-grasses, cocksfoot, Kentucky blue grass, and Paspalum dilatatum—are included in a group showing no hairiness of the blade or leaf-sheath (excepting at the junction of these, in the case of the paspalum.) The weedy grasses included are "blown grass," "swamp wallaby," "winter grass," and "windmill grass" (or "umbrella grass").

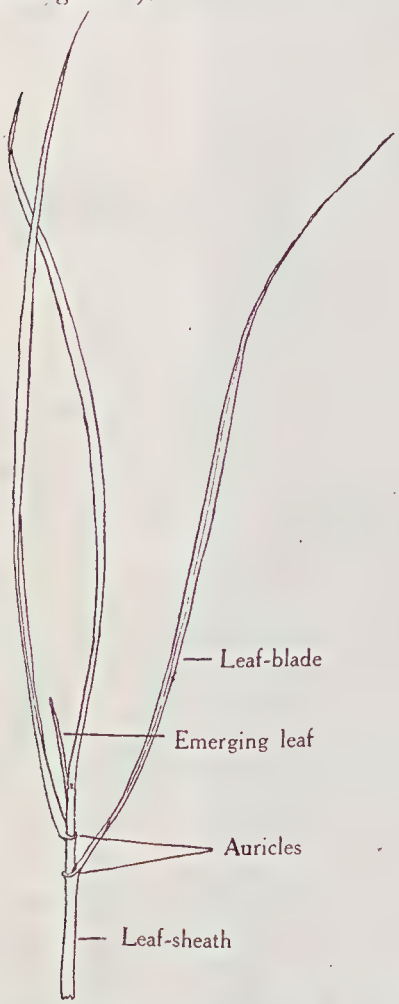


Diagram 2.—Stem of Rye-grass, showing parts valuable in grass identification, before flowering.

If the non-hairy grass shows a blade produced into two small curly stem-clasping processes (auricles) at the junction of blade and sheath, a rye-grass is indicated. This is confirmed if the upper surface of the leaf is ribbed, while the lower is quite flat. Articles describing the differences between the perennial and annual rye-grasses have appeared in the *Journal of Agriculture* recently, so that it is unnecessary to touch on them more than briefly now. While no absolutely reliable means of distinguishing them before flowering is available, it is usual to find the leaf of the annual and intermediate types rolled on emergence, while that of the true perennial type is folded. Wimmera rye-grass is usually "kneed" in the lower part of the stem, and usually reddish or purplish in colour in that region, but all rye-grasses showing these features are not necessarily Wimmera rye-grass. Rigid rye-grass, often miscalled "drake" in northern districts, is a poor stooler, and shows very little leaf.

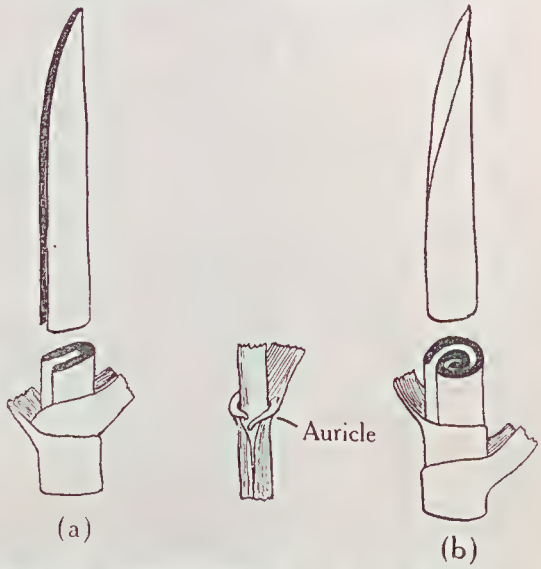


Diagram 3.—Illustrating types of emerging leaves in Rye-grasses; (a) folded in bud—typical of perennial rye-grass; (b) rolled in bud—typical of annual and intermediate types of rye-grass.

[From Percival's *Agricultural Botany*.

Suppose the specimen, having no auricles or hairs present, is now known not to be rye-grass. If the fully-grown leafblade is narrow (about one-eighth inch) and the ligule is short (up to one-eighth inch) or apparently absent, we next examine the tip of the leaf. If this is blunt, and the midrib is produced beyond it to form a small sharp point, "windmill grass" is indicated. If the tip is shaped like the prow of a boat, the grass may be either Kentucky blue grass (*Poa pratensis*) "winter grass" (*Poa annua*), or one particular species of Wallaby grass (*Danthonia*). If it is

Kentucky blue grass, there will be a patch, indicating that this grass is a perennial which spreads by underground rootstocks, and it will be fairly difficult to pull up a stem with roots attached. "Winter grass" is a pale-green annual, and the entire plant is easily pulled up. While Kentucky blue grass has not been popular as a pasture species, it has proved very palatable to sheep at Werribee, and has shown no tendency to escape from the field where originally sown over ten years ago. "Winter grass" provides a small amount of winter feed, but its productivity is so low that its presence in a pasture is not regarded with favour.

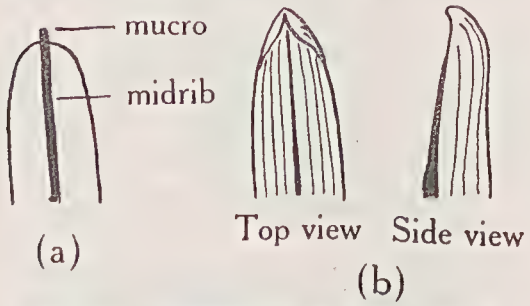


Diagram 4.—Differences in shape of leaf tip: (a) Windmill grass, (b) Kentucky blue grass.

The species of *Danthonia* referred to is a tall, tussocky grass usually found in damp situations, such as depressions, or along drains or channels. The "windmill grass" referred to is a native grass of fair palatability, the head of which consists of a series of long arms bearing the seeds and radiating from the top of the flowering stem. This is a common species in northern pastures which have not been adequately watered and manured, or have been badly overstocked.

If the non-hairy grass specimen has a narrow leaf-like rye-grass, but has a long ligule—up to half an inch in length—it is most likely to be "Blown grass" (*Calamagrostis filiformis*). The blade is very lax, and ribbed on the upper surface. The palatability and pasture value of this species are poor, and it is chiefly remarkable for the manner in which the seed is distributed. When ripe, the whole head, which is much branched and delicate in structure, breaks off, and rolls away with the wind. In damp situations a tall robust grass with broader leaf, and a long ligule similar to that of "Blown grass," often occurs. This is "Swamp Wallaby" (*Amphibromus nervosus*). Although it remains green well into the dry weather, owing to its situation, its fodder value is not as good as its appearance would indicate.

If the ligule is reduced to a semi-circle of short hairs, the grass is probably "Graceful Panic grass" (*Paspalidium* spp.), or "Plain grass" (*Eriochloa punctata*). These native grasses are becoming conspicuous under irrigation in some northern localities, and have a definite fodder value. The seeds of "Plain grass" being very hairy, the "Panic grass" is recognizable in head by the absence of hairs on the seeds.

The non-hairy grasses with a broad leaf (about one-quarter inch) are Barnyard grass, Cocksfoot, Paspalum dilatatum, and the Canary grasses.

Barnyard grass, referred to in the north as "Wild Millet," has no visible ligule. Although not favoured here, it is cut for hay in some parts of the United States of America under the name "Billion-dollar grass." Paspalum dilatatum and Cocksfoot, both valuable and well-known species, have a conspicuous ligule, and are distinguished by the emerging leaf which is rolled in Paspalum, and folded in Cocksfoot. In addition, Paspalum leaves usually show a purplish coloration at certain times, and have a few hairs at the junction of blade and sheath when immature. While Cocksfoot is consistently recommended as a species for permanent pastures, in association with perennial rye-grass and white clover, Paspalum dilatatum is recommended only for situations where drainage is difficult.

The Canary grasses have a long ligule, and the base of the stem, or the tips of the roots, are characteristically bright-red or pink. The perennial species (*Phalaris tuberosa*) is now receiving much attention as a grass for the lower rainfall areas. It is strong and tussocky, with a good bulk of palatable leafage.

Hairy Grasses.

Coming now to the grasses which show hairiness, if the hairs are present on both blade *and* sheath, and are sufficiently numerous to give a whitish, downy appearance, Yorkshire Fog is indicated. This identification is confirmed if bright-pink veins occur at the base of the stem, where they show up clearly against the white tissues. Yorkshire Fog is a mat-forming perennial, usually indicative of water-logged soil, and in the presence of other pasture species is unpalatable to most stock.

If the plant is not densely hairy, but has a few long hairs along the margins of the sheath or blade, or on the upper surface of the blade just above the junction of blade and sheath, it is safe to assume that it is a species of "Pigeon grass" (*Setaria*). These commonly occur in thinned-out lucerne stands, and are objectionable in lucerne hay because of their bristly seed-heads and, generally, low-feeding value. "Bent Pigeon grass" (*Setaria geniculata*) is a mat-forming biennial (or short-lived perennial) with narrow leaves of about one-eighth inch wide.

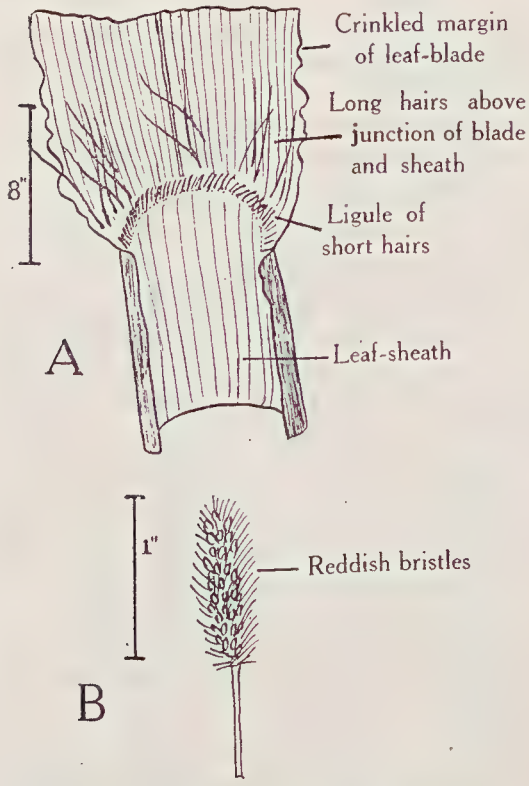


Diagram 5.—A "pigeon grass": (a) Showing the ligule of short hairs and long hairs on the blade enlarged; (b) a typical head (S. glauca).

"Pale Pigeon grass" (*Setaria glauca*) is an erect summer annual of fair palatability, but short-lived under grazing. The leaves are broad (up to one-quarter inch), crinkled along the margins, and pale-green in colour. The less common "Green Pigeon grass" (*Setaria viridis*) resembles it closely, and both have a cylindrical bristly head about one-quarter inch wide.

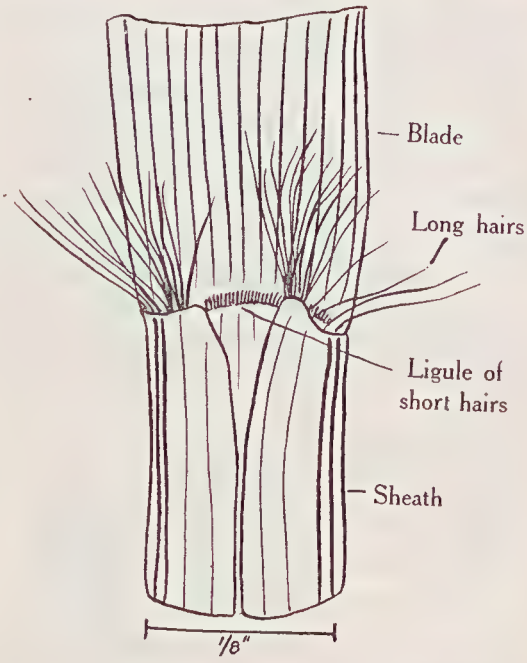


Diagram 6.—Wallaby grass at the junction of blade and sheath. Note the short hairs of the ligule and the long hairs at the top of the sheath (enlarged).

Grasses which have numerous short hairs on the upper surface of the blade (these may be best seen by holding the leaf up to the light, edge-on), in addition to hairs on the leaf-sheath, include the Wallaby grasses (*Danthonias*) and the Brome grasses.

With the one exception previously mentioned, the *Danthonias* are distinguished by conspicuous long hairs at the junction of blade and sheath, which feature is absent in the Bromes. Even those Danthonia variants which do not show hairiness of the leaves may be distinguished by this feature, since the only other common non-hairy grasses possessing it are creeping plants to be dealt with later. Being native to vast areas of the continent, the Wallaby grasses exhibit a wide variety of forms, and are the most valuable pasture plants of the dry areas. Their importance in irrigation is high as the acreage of irrigated natural pasture is still considerable. Owing to adaptation throughout centuries, to soils deficient in phosphates, they do not respond well to superphosphate, which is a disappointing feature. There are now a number of distinct species recognized in Victoria, but their

differentiation rests on features not easily visible, and determinable with certainty only from the seed-heads.

The majority of Bromes naturalized in Victoria are of little value, the exception being Prairie grass (*Bromus unioloides*). Soft Brome and Sterile Brome are common weeds under irrigation, and other species met with are Red Brome and Mediterranean Brome. It is difficult to distinguish these before flowering, and little is gained by doing so. Prairie grass leaves are quite definitely hairy in the young stage, but this character disappears as they mature, so that it is advisable, when examining grasses, to look at both old and young leaves.

The next group includes two grasses hairy *on the leaf-blade only*—Barley grass, and Silver grass or Brome Fescue.

Barley grass is so well known as to need no description, but it may be differentiated by the presence of auricles, similar to those of rye-grass, at the junction of blade and sheath, and which are absent from Brome Fescue.

Creeping Grasses.

Of the more or less hairy grasses dealt with so far, none spread above ground by means of creeping stems. Three common grasses which spread in this manner are—*Paspalum distichum* (Water-couch), Couch grass, and Creeping Bent.

Creeping Bent differs from the others by not being conspicuously hairy at the base of the leaf-blade. None have hairs on the upper surface of the blade. *Paspalum distichum* is the coarsest, the creeping stems or stolons being about one-eighth inch in diameter. It is found only in moist places, such as depressions and drains. In the former it provides succulent feed of moderate quality; in the latter it is a nuisance, retarding the get-away of surplus water. The seed-head is easily recognized, being shaped like the letter "Y." The bottom stroke is represented by the main stem, and the upper strokes by two spikes bearing the seeds.

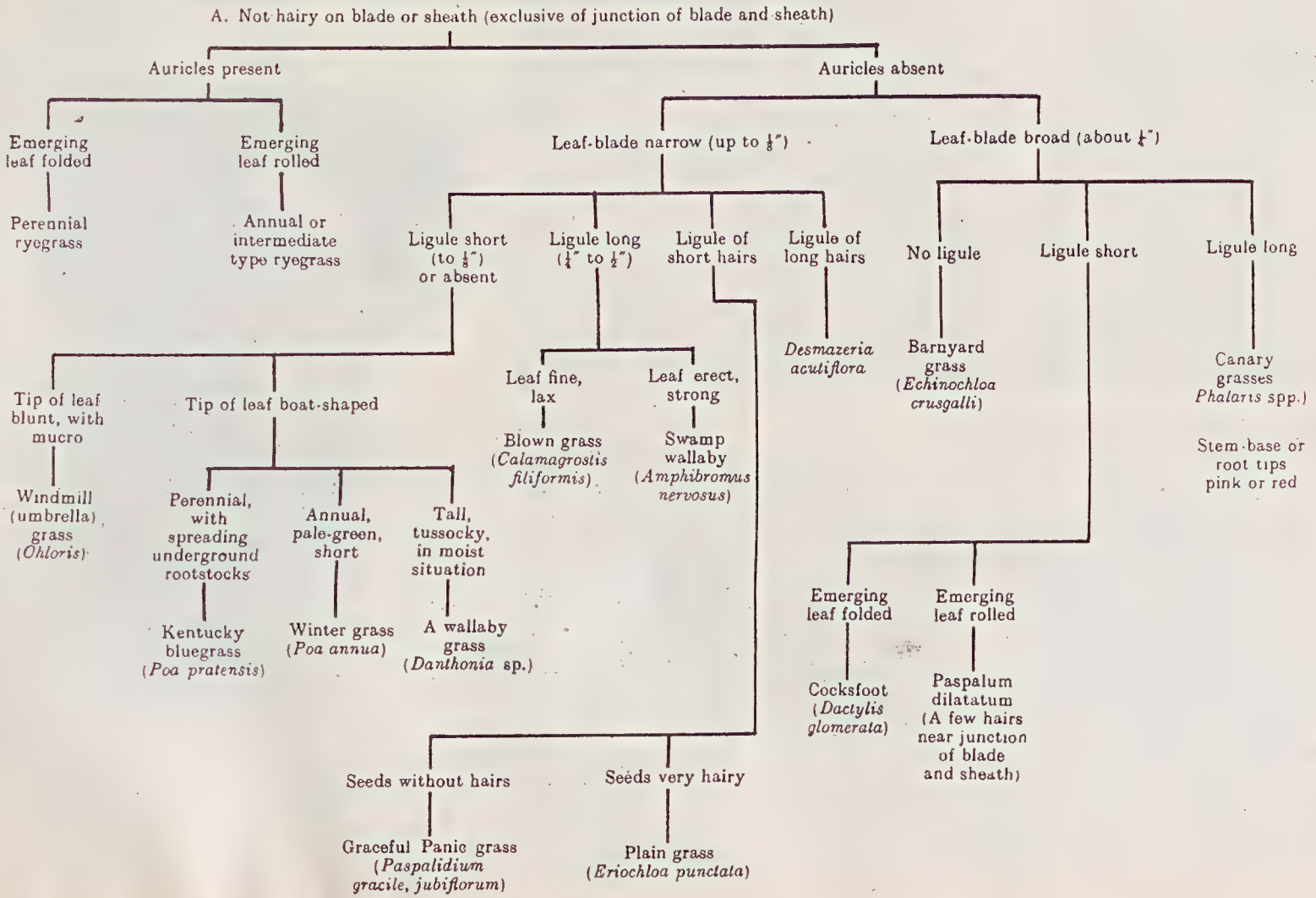
The head of couch grass, of which the creeping stems are usually finer, has about five of these spikes radiating from the top of the stalk. Couch grass is a much more drought-resistant plant than the water-loving *Paspalum distichum,* so that in many cases the place where the grass to be identified is found is a guide to its identity. The leaves of the former are usually hairless, while those of the *Paspalum distichum* are usually hairy on the under surface when young.

Where the stolons of Couch grass range from one-sixteenth to one-eighth inch diameter, those of Creeping Bent seldom exceed one-sixteenth.

The simple key on pages 318 and 319 may be used for the purpose of identifying the more common grasses. It must be borne in mind that it is reliable in the great majority of cases, but does not take into consideration *all* the possible variations which are to be found in any one species.

Key to identification, before flowering, of the grasses more commonly found in irrigated pastures.

I. Not Spreading Above-ground by Means of Creeping Stems:


A. Not hairy on blade or sheath (exclusive of junction of blade and sheath)
Auricles present
Auricles absent
Emerging leaf folded
Perennial ryegrass
Emerging leaf rolled
Annual or intermediate type ryegrass
Leaf-blade narrow (up to ⅛")
Leaf-blade broad (about ¼")
Ligule short (to ⅛") or absent
Ligule long (¼" to ½")
Ligule of short hairs
Ligule of long hairs
No ligule
Ligule short
Ligule long
Tip of leaf blunt, with mucro
Windmill (umbrella) grass (Chloris)
Tip of leaf boat-shaped
Perennial, with spreading underground rootstocks
Kentucky bluegrass (Poa pratensis)
Annual, pale-green, short
Winter grass (Poa annua)
Tall, tussocky, in moist situation
A wallaby grass (Danthonia sp.)
Leaf fine, lax
Blown grass (Calamagrostis filiformis)
Leaf erect, strong
Swamp wallaby (Amphibromus nervosus)
Desmazeria acutiflora
Barnyard grass (Echinochloa crusgalli)
Canary grasses Phalaris spp.)
Stem-base or root tips pink or red
Emerging leaf folded
Cocksfoot (Dactylis glomerata)
Emerging leaf rolled
Paspalum dilatatum (A few hairs near junction of blade and sheath)
Seeds without hairs
Graceful Panic grass (Paspalidium gracile, jubiflorum)
Seeds very hairy
Plain grass (Eriochloa punctata)

Key to identification, before flowering, of the grasses more commonly found in irrigated pastures.

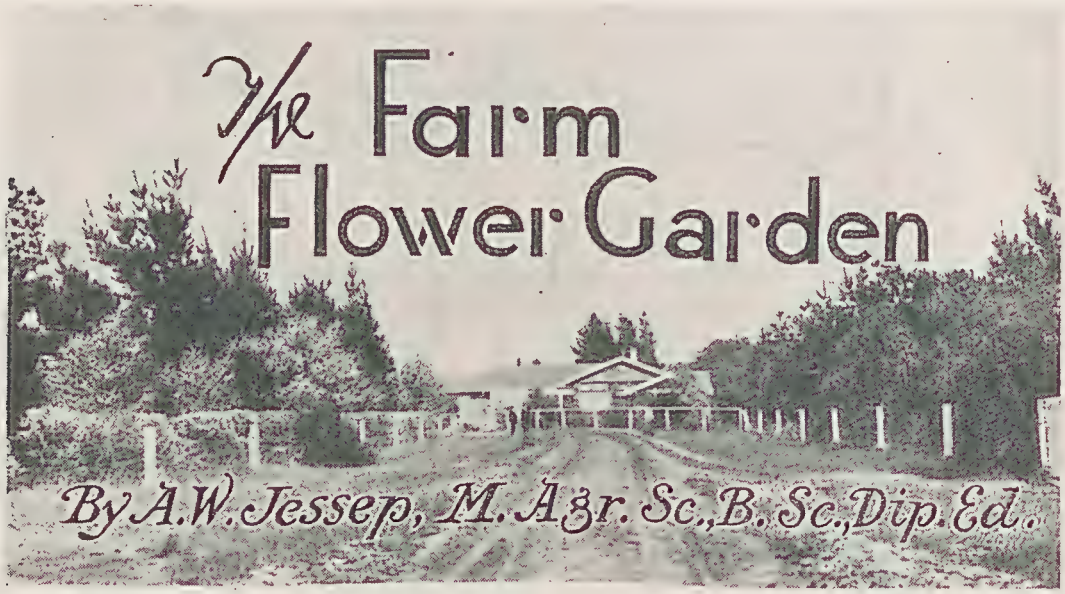
I. Not Spreading Above-ground by Means of Creeping Stems—(*continued*).

B. Hairy on blade or sheath (exclusive of junction of blade and sheath)

- Hairs completely covering blade and sheath, giving downy appearance
  - Yorkshire Fog (*Holcus lanatus*)
  - Pink veins at base of stem
- Numerous short hairs on blade and sheath
  - Conspicuous tuft of long hairs at junction of blade and sheath
    - Wallaby grasses (*Danthonia* spp.)
  - No tuft of long hairs at junction of blade and sheath
    - Brome grasses (*Bromus* spp.)
- Few long hairs along margins of sheath and blade, or on the upper surface of blade, just above junction of blade and sheath
  - Narrow-leaved mat-forming biennial
    - Bent pigeon grass (*Setaria geniculata*)
  - Broad-leaved erect annual
    - Green Pigeon grass, Pale Pigeon grass (*Setaria glauca*, *S. viridis*)
- Hairs on leaf-blade only
  - Auricles present
    - Barley grass (*Hordeum murinum*)
  - Auricles absent
    - Brome Fescue or Silver grass (*Festuca bromoides*)

II. Spreading Above-ground by Means of Creeping Stems (Stolons):

- Conspicuously hairy at junction of blade and sheath
  - Stolons large young leaves hairy on under surface, two spikes in head
    - Water Couch (*Paspalum distichum*)
  - Stolons about $\frac{1}{16}$" young leaves hairless on blade, about five spikes in head
    - Couch (Bermuda grass) (*Cynodon dactylon*)
- Not conspicuously hairy at junction of blade and sheath
  - Creeping Bent (*Agrostis alba stolonifera*)



A FLOWER garden is essential to a dwelling, no less so to the farmhouse than the suburban villa.

Flowers on the farmstead are not usually looked upon as a profitable proposition, and for that reason some farmers will not give more than a minimum of time to their cultivation. It must be pointed out, however, that the women folk are indoors for the greater part of the day, and a little encouragement and assistance given them to help in keeping a garden have more advantages than at first appear. A garden gives an added interest and an avenue for training the aesthetic taste. It trains the children to care for things, teaches them that plants respond to careful treatment, and the principles thus learned in the garden are applied to farm work in general.

Establishing a Garden.

In establishing a flower garden, do not make the mistake of setting aside too large an area. In a fit of enthusiasm one is apt to think that a large garden is going to be easy to manage, but this is a mistake. The garden should be in accordance with the size of the house. An area of about 200 to 250 square yards is probably more than sufficient for the time that can be given to it.

After selecting the area in front of the house for the flower garden, see that it is securely fenced, to keep animals out. Chain wire or fabric fencing make a better fence than do pickets, which need painting or oiling from time to time, and these repairs to pickets become very costly when spread over a period. Wire-netting is another material used, but it is not very satisfactory, because domestic animals gradually damage it.

After fencing, definitely plan out the garden on paper, otherwise the final result may present a patchwork appearance. In making this plan, there are four main features to be kept in mind—lawn, annuals, shrubs, and hedges. It is between these four that harmony must be attained.

Before commencing planting, give the area a good working. In starting a new garden, dig it over, and, if necessary, half-trench it; but, instead of planting the permanent features, such as lawn and shrubs, put in annual plants in rows, or plant vegetables, such as peas or potatoes, so that during the growth of these plants the ground can be kept clean and free from weeds. This latter course certainly might not give the house a very attractive appearance, but it is well worth following in the first year to get the soil in a fit condition, which will save many hours of monotonous weeding later. The trouble taken and the toleration of an unattractive appearance for twelve months are worth while, because once the permanent features are planted they should be there for many years.

Compare the surroundings of this home with the beautiful garden below.

The hedges may be planted first. In considering which are the most suitable, the gardener should ask himself the question—"Why is a hedge being planted?" Is it for shelter from the prevailing cold or hot winds, or is it for appearance? If for shelter, the Cypress, *Lambertiana horizontalis,* will stand up to very trying conditions, and make a very fine breakwind. When buying these trees, always ask for the plants raised from cuttings, as those grown from seedlings do not always stand up to the constant trimming that a hedge requires to keep it looking well, and, in addition, plants grown from seedlings sometimes die after a few years. Most nurseries now raise this Cypress from cuttings.

If mainly for ornamental purposes, the Golden Privet gives a good effect. There are several other kinds of hedge plants, and it is a good idea to visit several parts of your district, and study the hedge plants growing there before deciding on one for your own garden. Individual plants of a hedge of Cypress *Lambertiana horizontalis* should be planted about 3 feet apart, and of Golden Privet about 12 to 15 inches. Work up the ground carefully beforehand, and plant out in the late autumn, as this allows the plants to become well established before the hot weather commences, when they must be carefully watered.

Having the hedge site fixed, and the area well worked up after the first year of annual plants, set out next the area for the lawn, taking into account the fact that the edges have to be cut. Do not try to make fancy shapes or break the lawn with too many beds. After careful preparation of the area for the lawn, English grasses may be sown in May or June, or about late August. Should it be desired to plant Buffalo grass, it is necessary to wait until the warmer weather, about October. Both types of lawn have their advantages and disadvantages. The Buffalo does not stand the frost, and has a dead appearance in winter, while the English grasses need very careful watering during the hot weather. Soils are an important factor in deciding on a lawn. In the warmer regions, and especially on the lighter soils, the use of Buffalo grass is advised, but on heavy soils in most districts the mixed type of lawn probably would be the most suitable. These are the permanent features, and should be carefully selected, because once put in they should remain there.

Shrubs.

It is advisable to see the various shrubs growing in order to get an idea of their suitability for the different positions in the garden, for often one finds that tall-growing

An attractive farm garden.

plants are placed where small ones should be, and deciduous where evergreens should have been planted. Sometimes the heights given in various catalogues are misleading, and it is a good idea, where practicable, to inspect the plants growing before purchasing. Too often, plants suited to a cold climate are chosen for a warm climate, and vice versa, and do not give the effect desired under the new conditions. This is very noticeable with autumn foliage plants, which grow well and colour beautifully in the hill country, but do not do so well in a warmer district. After having selected the shrubs according to the position in which they are to be planted, mark the places on the plan, so that when the plants arrive they may be put in immediately.

When planting, do not make a deep narrow hole, as such a hole often acts as a grave for many plants; the rain water running into it lodges there, and the plant is gradually drowned or dies of cold. A hole about 18 inches deep and 4 feet in diameter should be made, and a stake put in. When planting deciduous trees, cut back the roots and the limbs. Firm the soil around the roots, and fill the hole three-quarters full with soil, and tie the plant to the stake. Then put in about a kerosene-tin full of water, and after the water has soaked away, fill in the rest of the soil. Planting of evergreens is done in the same way, but these plants are usually potted, and can be knocked carefully out of the pot and planted without disturbing the roots.

In selecting shrubs, have in mind some special features required, such as evergreen or deciduous foliage, berry, floral, or a combination of these.

A Tongala Settler's Home.

Perennials.

The perennial herbaceous plants can be planted to suit the area, and these plants are very useful, especially when the water supply is scanty. With these the main attribute is colour, but in all cases it is essential to grow plants that suit the district. These need little attention, and yet give a very good floral effect. Some of the following might be chosen:—

For Cool Districts. — Alstroemeria (bulbous and lily flowers about the size of a Watsonia), Montbretia, Heuchera, Xmas Rose, Iris, Lily, Penstemon, Spiraea, Lavender, Lupin, Saxifrage.

For Districts of Moderate Climate.— Aster (with its many varieties and colours), Montbretia, Carnation, Cosmos, Sunflower, Iris, Redhot Poker, Antirrhinum, Pyretheum, Phlox, Rudbeckia, Scabies, Spiraea, and Violets.

This shrubbery has transformed an unsightly corner into a beauty spot.

For Hot Districts. — Aster, Redhot Poker, Lily, Antirrhinum, Canna, Carnation, Salvia, Cat-mint, Pigface, Geums, and a large number of rock plants, such as the Cacti group.

Those mentioned are but a few that may be chosen from. In addition, there are the showy plants that may be treated as annuals, in that they are taken out of the ground and stored until required for planting again, and prominent among these are the Dahlia, Gladiolus, and Ranunculus.

Annuals.

Next come the annual plants which give the finishing touches to a garden. From the numerous kinds available, the gardener should select those that suit his district, and try to blend the colours. Small isolated patches should be avoided, and endeavour should be made to grow annuals in masses of the same kind and colour. This is much more effective than having many colours and types in the same patch, and repeating it throughout the garden. Massed colours of orange, pink, red, and yellow are very effective so long as the colours are not allowed to clash.

To attain beauty in a garden, it is necessary to secure equilibrium between the various permanent and temporary features — the shrubs, lawn, and annuals. The hedge and shrubs are the framework which must be carefully planned, with the lawns as neutral areas, and the annuals so arranged as to fit in with the framework and give that array of colour which makes a garden so beautiful. The planting is very important, but the after-care or maintenance is much more so. A well laid-out garden that has been neglected is a sad affair, and it is not wise to start with too large an area.

Maintenance.

The maintenance of a garden consists of— (*a*) keeping the permanent features in order by trimming the shrubs and perennial herbs,

(*Continued on page* 332.)

Cinerarias and ferns in a shady corner.

San José Scale

Winter Spraying Experiments at Shepparton

By W. A. Rolfe, Orchard Supervisor.

THE San José Scale (*Aspidiotus perniciosus Comstock*) was first noticed in the Shepparton district more than fifteen years ago, and of late years has spread so rapidly that the fruit industry there has become seriously endangered. While the pear and apple in particular are the trees most freqently attacked, the scale has been observed also on the peach, almond, quince, plum, and apricot. It spreads very rapidly on the main limbs and twigs, and if unchecked will kill a tree usually in less than a year. Figure 1 illustrates spurs and leader of a Packham pear tree killed within twelve months of initial infection.

The rapid spread of this scale, despite the control efforts of the district growers, led, in 1932, to Mr. A. A. Hammond, who was then Chief Orchard Supervisor, initiating spraying experiments to endeavour, during the dormant season, to discover the most effective methods of combating the pest, with the following results:—

Experiment No. 1.

The experimental block was on Mr. H. Hill's property, and consisted of six rows (seven trees in each row) of Packham's pears, situated in an area of 4 acres of this variety. These trees were specially selected for experimental purposes because of the heavy, uniform infestation, which made them ideally suited for experimental tests. The following treatments were applied:—

Row 1.—Kleenup (winter white oil), 2 gallons; lime sulphur (Baume 30), 5½ gallons; water, 72½ gallons. Total, 80 gallons.

Row 2.—Shellicide D (winter white oil), 2 gallons; lime sulphur (Baume 30), 5½ gallons; water, 72½ gallons. Total, 80 gallons.

Row 3.—Lime sulphur only (Baume 30), 9 gallons; water, 71 gallons. Total, 80 gallons.

Row 4.—Kleenup oil, 5 per cent.

Row 5.—Shellicide, 5 per cent.

Fig. 1.—Leader and fruit spurs (Packham's pear) killed by San Jose scale.

Note.—A tar distillate wash was also applied in these tests, but as this material is the subject of further comprehensive investigation the results are not included here.

All the sprays were applied on the 1st July, 1932, with a power spray pump, through a spray gun, at a pressure of 175 lb. per square inch, all trees being very thoroughly sprayed. This is important, as the thoroughness of application of the spray is essential to success. The weather was bright and sunny, following a heavy frost.

Fig. 2.—Pear tree showing limbs killed by San Jose scale, also fresh growth from fork of tree.

Results.

When the fruit had matured, it was picked and counted, and all cases of scale infestation noted. As infested fruits exhibit a red circle around the scale, it is easily visible. A careful examination was also made of the limbs and twigs of the trees, but no attempt was made to count scale on the trees, owing to the minute nature of the insect. The following results were obtained:—

	Number of non-infested fruits.	Number of infested fruits.
Row 1.—Kleenup and Lime Sulphur	15 boxes (app. 1,800 fruits)	1
Row 2.—Shellicide D and Lime Sulphur ..	18½ boxes (app. 2,200 fruits)	Nil
Row 3.—Lime Sulphur only	17 boxes (app. 2,040 fruits)	11
Row 4.—Kleenup ..	22 boxes (app. 2,640 fruits)	21
Row 5.—Shellicide D ..	19 boxes (app. 2,280 fruits)	5

It is seen that all of the above spray materials gave good commercial control of the insect.

When it is revealed that the fruit on these same trees in 1931 was approximately 90 per cent. infested, the above results must be considered very satisfactory. An interesting observation made on 7th September, 1932, was that trees sprayed with oil and oil combinations burst into leaf eight to ten days before those sprayed with lime sulphur alone.

Experiment No. 2.

The second experiment was carried out on Mr. C. G. Harris's property. Two rows, each of six trees of Williams pear, and slightly affected with scale, were treated as follows:—

Row 1.—Shellicide D (winter white oil), 2 gallons; lime sulphur (23 Baume), 7 gallons; water, 71 gallons. Total, 80 gallons.

Row 2.—Kleenup (winter white oil), 2 gallons; lime sulphur (23 Baume), 7 gallons; water, 71 gallons. Total, 80 gallons.

Application was similar to that in the experiment on Mr. Hill's property, with the exception that spray rods and nozzles were used in place of a spray gun. The sprays were

Fig. 3.—Pear tree recovering from San Jose scale following remedial measures. Note leaders killed by scale and new growth from crotch of tree.

thoroughly applied on 30th June, 1932, with the following results:—

	Number of non-infested fruits.	Number of infested fruits
Row 1	10 cases (app. 1,200 fruits)	3
Row 2	11 cases (app. 1,320 fruits)	2

Although these trees were not so heavily infested as those in the previous experiment, the above results clearly indicate that the combination sprays, which had not previously been in general use, are an effective means of control. Other oil sprays that have been used in the dormant season with good results are red oil, 5 per cent., and crude oil, 5 per cent.

The scale insect depends for its food supply on the sap of the tree, and consequently the amount of sap absorbed in a heavy infestation is considerable, and often results in the death of large limbs.

One sign typical of the pest is the formation of a reddish tinge in the bark, beneath the scale. The bark later becomes dry, and cracking occurs. If effective control measures are applied to a heavily affected tree in which some of the limbs are already dead, the tree responds by producing a number of laterals from the fork and base of the main leaders.

Life History.

In Victoria the San José scale passes the winter under a resistent, waxy scale in an almost mature state of development. In spring the female reaches maturity, and the male insect emerges from under its scale as a winged form. After fertilization by the male the female commences to reproduce at the rate of 400 to 500 young in about six weeks. The female insect then dies. The young crawl about the tree for some time, and then insert their proboscides (or beaks) into the plant and commence to form the waxy covering (or scale) over themselves. At this time of the year the scales reach maturity in about a month after which reproduction of young begins. Thus the total life of the insect is about ten weeks or, in other words, each generation is approximately of ten weeks' duration. The mature female scale is circular, and varies from one twenty-fifth to one-tenth inch in diameter. The male scale is elongated, nearly twice as long as it is broad, and is usually darker in colour than the female.

Observations in the Shepparton district have shown that the first brood of young scale occurs in October, and successive broods continue through the season until April or as late as May.

Fig. 4.—Normal pear tree.

Summer Spraying.

During the growing season of deciduous trees, in which period the scale reproduces and also infests the fruit, it is sometimes necessary to supplement the winter spraying by summer oil spraying.

It should be remembered, however, that as damage is more likely to occur, as a result of spray application during the growing than during the dormant period, summer sprays should be of weaker strength than winter sprays. A large percentage of the insects being small and immature during this season, they are consequently more easily destroyed. Growers in the Shepparton district have found that high-grade white oil sprays applied during the months of January, February, and March have proved a very effective check to the development of scale. Many orchardists in their usual spray programme apply these summer oils for the control of Codling Moth, which thus serve a double purpose. The summer oils are used at a strength of from 2 to 2½ per cent.

The Sheep Industry

Helpful Hints to Sheep-men

11.—Buildings, Yards, etc.

[Previous articles of this series, which appeared in the June, July, August, September, November, and December, 1932, and January, February, March, April, and May, 1933, issues of the Journal, dealt with the selection of ewes and rams, lamb marking, classing the wool clip, fat lamb raising, the sheep blowfly, foot-rot, worms, liver fluke disease, infectious eye disease, sheep nasal bot and hand-feeding.]

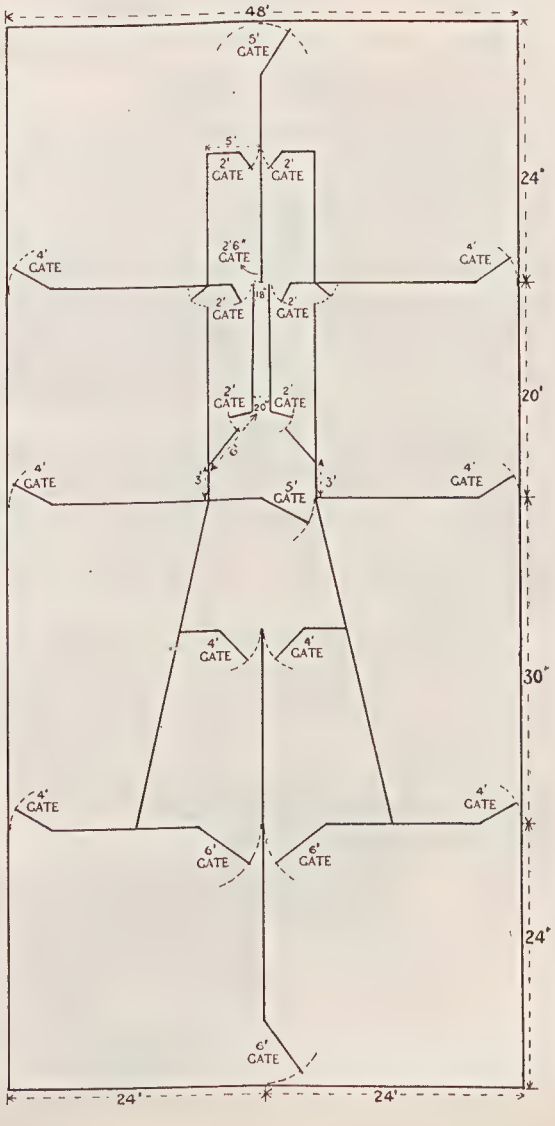
Drafting Yards.

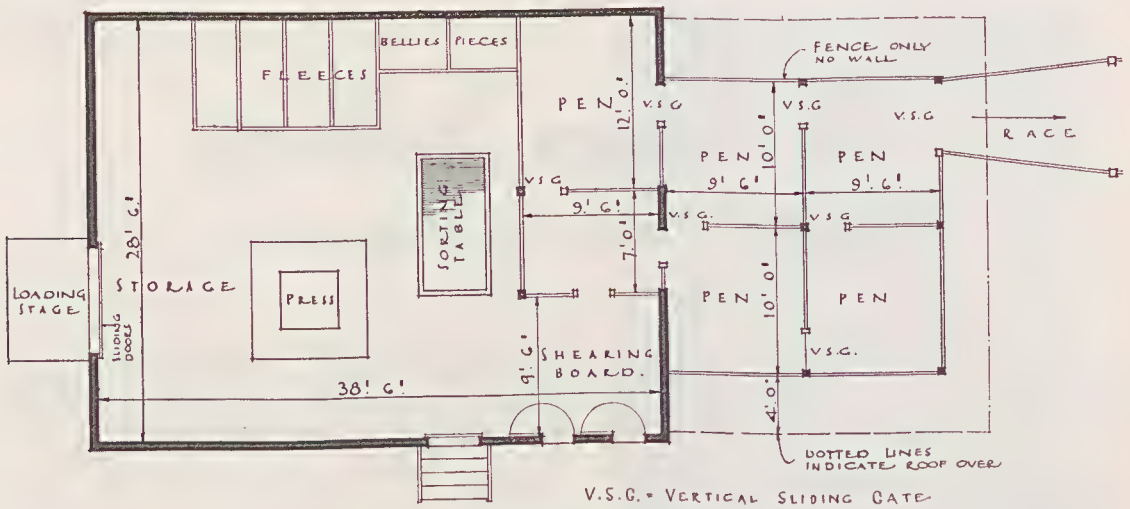
THE drafting yards shown in the accompanying sketch may be adopted for the use of flocks of any size—allowing an area of 3 square feet per sheep. The dimensions shown on the yards illustrated would provide sufficient accommodation for the comfortable handling of approximately 800 sheep. With this lay-out the yards may be used not only for drafting, but also for classing the sheep. The need for facilities for classing the flock is often overlooked by growers when laying out a set of yards, though experience has shown that to produce reasonable wool, and obtain the maximum possible return from the sheep the grower must cull and class his flock regularly. If that important work is to be carried out satisfactorily reasonable yard facilities must be provided.

In the yards illustrated no outside gates are shown—these are to be placed as circumstances demand. The crush pen is designed to carry eighteen sheep and, if considered necessary, the one corner may be cut off and a tree planted providing the site chosen for the yards has suitable drainage. This also applies to the two corners in the two small yards flanking the race.

The race should be 12 feet in length and narrow enough to prevent sheep turning round. It should be closely boarded up to about 3 ft. 6 in. with dressed boards fastened on the inside of the posts. The race gate should be 2 ft. 6 in. to 3 feet. All gates must be strongly made. The four small check pens shown will hold approximately 25 sheep each, and the main entrance yards or receiving yards will hold approximately 400 sheep.

Posts and rails or saplings are recommended for yards. On no account should wire-netting be used.





Plan of shearing shed.

Shearing Shed.

The accompanying plan of a small shearing shed is one prepared by Messrs. Laird and Buchan, of Geelong, in conjunction with the Sheep and Wool Expert of the Department of Agriculture. The shed has been designed to allow sufficient space for the use of a portable shearing plant. The main idea applied to this shed is one of economy, in so much as extra accommodation for woolly sheep can be provided without the expense of housing in the shed proper.

The positions of the bins, press, and rolling and skirting table in the plan are only suggestions, as it will be necessary to alter these according to the location of the shed with reference to light, &c. Sufficient light is of great importance on the board and in the wool-room.

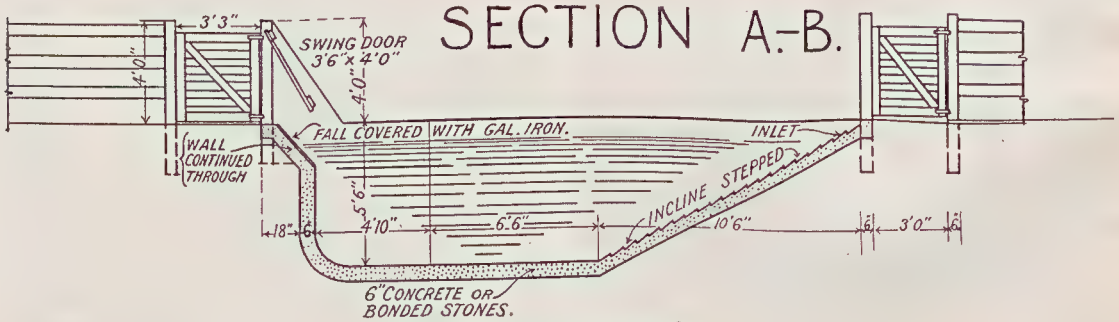
In calculating the space requirements for any number of sheep a good rule is to allow 3 square feet per sheep. For the rolling table, the size recommended is 10 ft. 6 in. x 5 feet, and almost 3 feet high. Particulars of larger sheds may be obtained on application to the Department of Agriculture, Melbourne.

Sheep-dip.

Walk in and slide dips are, and have been, very serviceable, but suit some classes and ages of sheep better than others. Almost every sheep-owner will readily admit the difficulty experienced in getting the sheep up to the dip.

Messrs. Leigh Brothers, of Roselea, near Geelong, the designers of the dip shown in the accompanying illustrations, recently invited a number of interested people to witness a demonstration of this dip under actual working conditions. The party was unanimous in its report as to the improvement effected by the use of this new design.

A special feature is a decoy pen, which is situated well past the end of the dip—thus sheep when coming in are driven past the end and not towards the dip. All ages of sheep can be handled by one man right from the collecting pens into the bath or swim. By



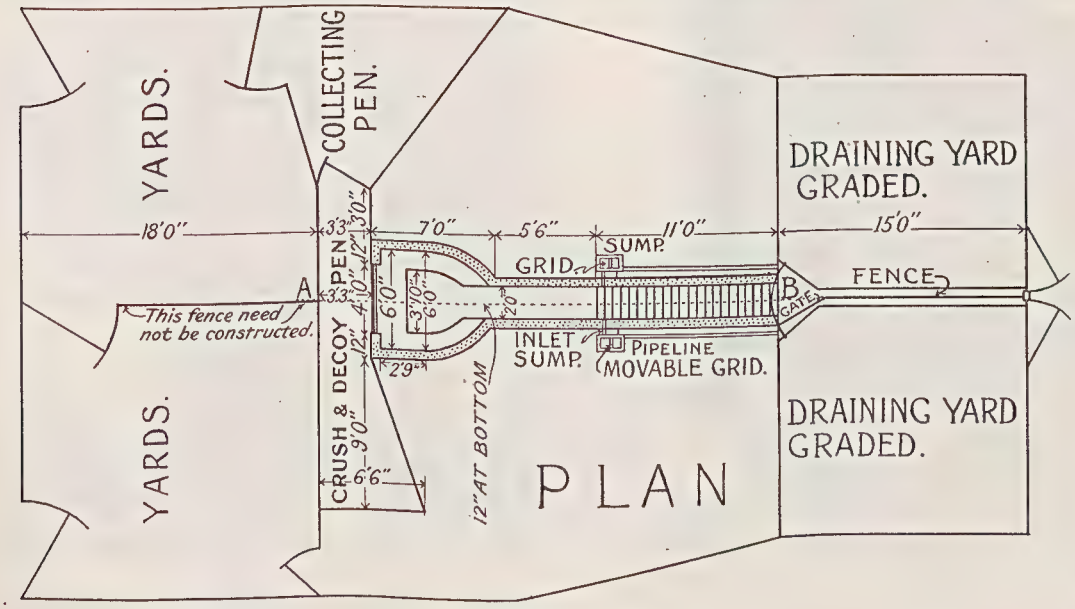
Sectional view of sheep-dip.

sliding into a pool first, the sheep have plenty of room for immersion, and are unable to get away before being put under. In other words, the operator has complete control of the sheep all the time. This pool also does away with the extra long swim advocated by many, though, of course, the swim can be made as long as desired.

Another advantage of the pool is that the user can commence dipping with, say, 1,200 gallons, and continue down to as low as 500 gallons, and even lower for lambs. This is a big consideration to many. A sheep three days after shearing will take out approximately one-third of a gallon and one, say, a month after, would carry out about three-quarters of a gallon. It can be readily seen, therefore, that there is a distinct advantage in being able to dip at a low level. Should it be so desired, the walk out could be made on an easier incline.

This design is most suitable for owners of large or small flocks, and can be operated easily by two men. In the opinion of the writer it represents one of the most important improvements made in the handling of sheep for some time.

These particulars and those below, showing the quantities and estimated cost in both concrete and brick of a dip similar to the one illustrated, are given with the sole idea of passing on to those interested something that it is believed will be an outstanding advantage to them in their work.



Plan of sheep-dip.

Quantities and Estimated Costs.

CONCRETE.

Dip—6.5 cubic yards. Draining yard—4 cubic yards.

MATERIALS.

	Cement.	Sand.	Metal.
Dip	26 bags	3 cubic yds.	6 cubic yds.
Draining yard...	16 bags	2 cubic yds.	4 cubic yds.
Total ...	42 bags	5 cubic yds.	10 cubic yds.

COST.

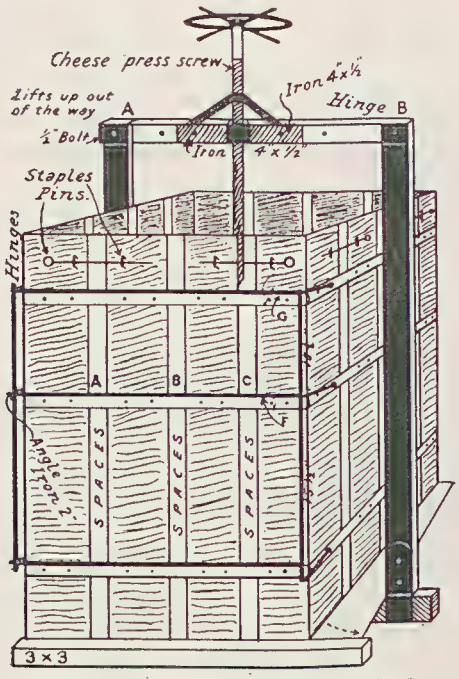
Dip, 6.5 cubic yds. at £4 ...	£26	0	0
Draining yard, 45 sq. yds. at 5s.	11	5	0
Estimated cost ...	£37	5	0

BRICKWORK.

Dip—				
Bricks, 2,600, at £6 10s. per 1,000	£16	18	0	
Cement, 14 bags, at 8s. ...	5	12	0	
Sand, 2 cubic yds., at 10s. ...	1	0	0	
	£23	10	0	
Labour	5	0	0	
				£28 10 0
Draining Yard—				
Bricks, 1,500, at £6 10s. per 1,000	£9	15	0	
Cement, 6 bags, at 8s. ...	2	8	0	
Sand, 1 cubic yard, at 10s. ...	0	10	0	
	£12	13	0	
Labour	3	7	0	
				£16 0 0
Estimated cost				£44 10 0

Home-Made Wool Press.

That there is need for an efficient, serviceable wool press, which may be made at home by any one with a reasonably good knowledge of wood-working methods, is evident from the number of inquiries for plans received at various times. Herewith are set out the plans and directions for making such a press. The original of the press shown was owned by Captain F. L. Edge, of Leslie Manor, who supplied all data and plans.

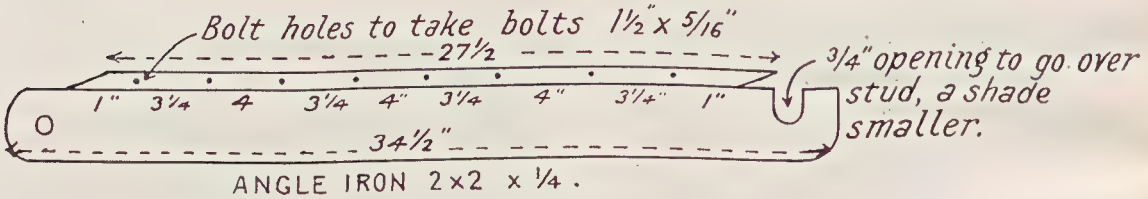


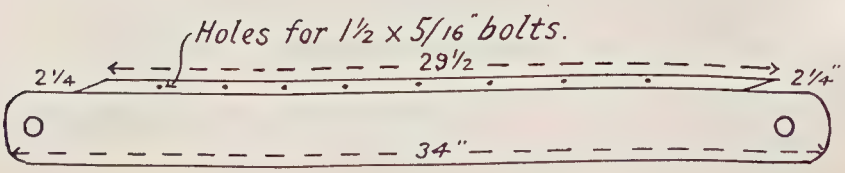
All Timber 6 x 1 h.w. except uprights 4 x 3.
Inside measurements of press 4'4" high and 2'4" square inside.

Fig. 1.—The Press ready for operation.

The materials required are sixteen planks 6 in. x 1 in. x 4 ft. 6 in., which, clamped together with angle irons (Figs. 2 and 3) form the wool receptacle (Fig. 1); six planks 6 in. x 1 in. x 2 ft. 6 in. for the floor; two wooden uprights, 4 in. x 3 in. x 5 ft. 9 in., to be fitted to another piece of timber 4 in. x 3 in. x 3 ft. 6 in., which runs under the floor of press, and to which the frame is fitted; twelve angle irons (see Figs. 2 and 3) to clamp the timber in position; a cheese-press screw or similar device; a metal socket (A, Fig. 5) which is placed on the wooden cap for screw to work in; a wooden cap (Fig. 7), 2 ft. 2½ in. square, and made of eight 6 in. x 1 in. x 2-ft. 2½-in. boards, which are fitted cross-wise, four on top and four below, with three spaces of 2 inches between the bottom boards, to allow the skewers to be placed in position before screw is released; the door catch (Fig. 6), made of 1-in. x ⅜-in. iron 2 ft. 7 in. long, with three projecting pieces each 8 inches long, which are fitted to the angle irons on the side of the press opposite to the fixed side. This catch serves to keep the door securely in position.

Figure 1 shows the press ready for operation. To operate, remove the screw and cap, place the empty bale in position in the press, turning the loose ends over the top edges of the press, where they are fixed by the pins and staples illustrated (Fig. 1), fill to overflowing with wool, replace wooden cap (Fig. 7) in position, and screw down to full length of the





Figs. 2 and 3.—Showing (top), angle irons used for side bars on door side, and (lower), other strengthening bars.

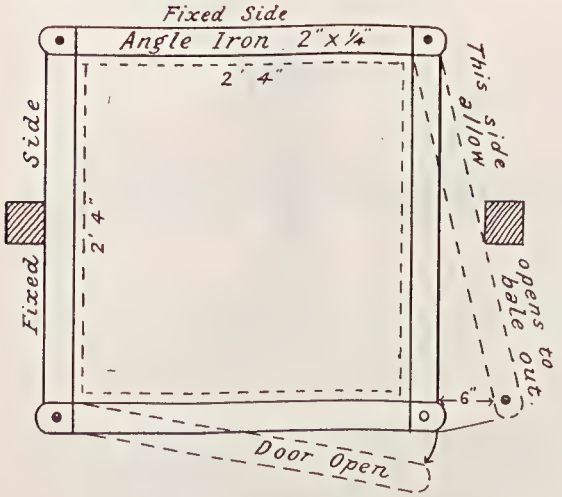


Fig. 4.—Shows movable side and door.

screw. This should bring the wool down to the middle of the press. (For this first operation, do not put the hessian bale cap on.) Pass skewers (Fig. 8) through the three gaps A, B, and C (Fig. 1) under the middle angle iron across the top of the wool (and between the 2-in. spaces left in wooden cap (Fig. 7) for

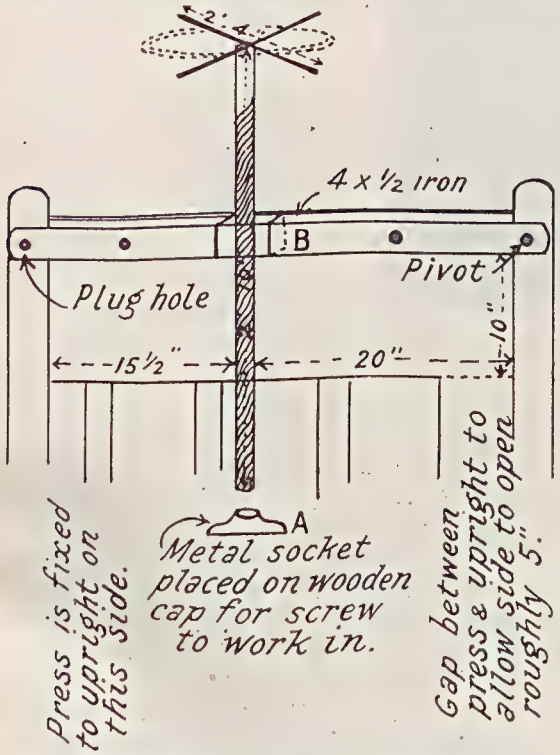


Fig. 5.—Showing the mounting of the Press Screw.

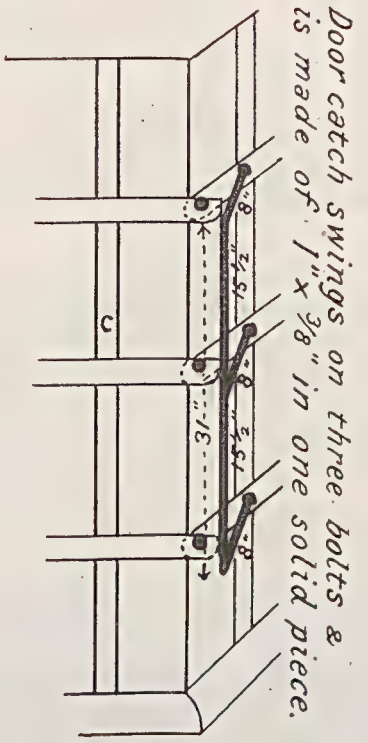


Fig. 6.—Detail of door catch.

the purpose) to the corresponding position on the opposite side of the press. The skewers hold the wool in position while the wooden cap is removed and more wool inserted. The hessian bale cap is placed in position, and the screw again operated. When the wooden cap has been screwed down about 1 foot, remove skewers. Then complete the operation by screwing to limit, when three stitches with binder-twine are inserted in the hessian bale cap and the bale through the gaps A, B, and C, on each

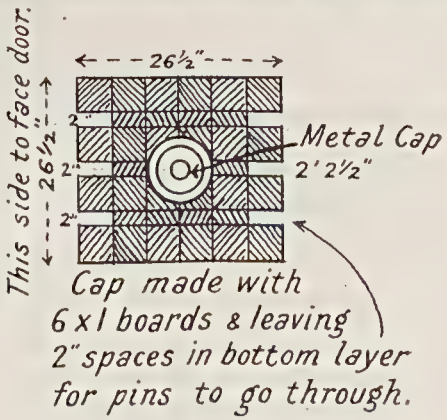


Fig. 7.—Detail of wooden cap.

side of the press. This method is easier and quicker than to use skewers to hold the bale cap in position until the wooden cap is removed.

Fig. 8.—One of large skewers used for holding wool in position.

The bale fasteners are fixed, and the temporary stitches may then be removed. When taking out the bale, undo door catch as shown (Fig. 9), open front door wide, then open side of press to the limit imposed by upright, as shown (Fig. 4). This enables the bale to be easily removed.

This press has been found to work satisfactorily by the user, who built the original for approximately £5. Although certain timbers and other materials are mentioned as having been used in its construction, it is not to be inferred that minor departures cannot be made in these matters, provided the general outline and measurements are followed.

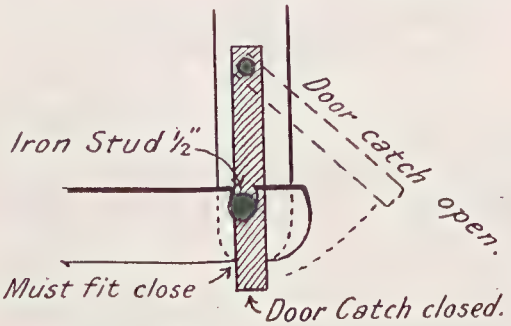


Fig. 9.—Detail of door fastening.

The Farm Flower Garden

(Continued from page 323.)

and keeping the lawns well cut and trimmed; (*b*) removing the portions no longer required, and preparing for a re-planting of the annuals; (*c*) rotating annuals in different beds to avoid proneness to disease; and (*d*) giving each bed a rest after digging, and before planting again to allow the sun to sweeten it up.

If water is laid on, then watering does not present many difficulties; but where water is scarce, a great deal may be done by judicious planting and cultivating. Keep the soil well stirred for the first inch or two, which helps to conserve the moisture, and much can be done to brighten up the garden by arranging planting to get the main blooms out early before the very dry weather arrives. There are plants to suit every climate, and if water is a summer problem, grow annuals to give a good winter and spring display, and depend on hardier perennial plants, such as rock plants, Cacti, and shrubs, for the hot weather showing.

In constructing a garden, there are several aspects which are very important, and they are as follow:—

(1) Set out the garden according to a definite plan.
(2) Do not try to have a permanent garden in a hurry.
(3) Select plants very carefully.
(4) Plant no greater area than can be conveniently looked after.
(5) Group plants for colour.
(6) Cultivate the ground very carefully. This helps plants to grow through dry spells.

Gardening is a very cheap pastime, and gives a touch of homeliness to the home. A well-kept garden is a good indication of the habits of the dwellers within the house. It is a healthy exercise, a fascinating hobby, and succeeds in making the surroundings of the home more congenial and beautiful.

Potato Growing in Victoria

No. 4. Plant Food Requirements

By J. T. Ramsay, Potato Expert.

Previous articles of this series, which appeared in the March, April, and May issues of the Journal, dealt with the condition and selection of seed, seed storage methods, and change of seed.

IN all fertile soils most of the plant foods necessary for successful cropping are present in sufficient quantity, but, frequently, it is necessary to add to the soil one or more of these plant foods if maximum yields are to be obtained. The elements most generally deficient are phosphorus, nitrogen, and potassium. There are two ways by which the supply of these plant foods in the soil may be increased for the benefit of crops—

(1) By applying organic matter as green or stable manure, and
(2) By the application of artificial fertilizers.

An early crop of Potatoes at Bacchus Marsh.

Green and Stable Manures.

Green manure is the name generally given to a crop which is grown specifically for the purpose of being ploughed under, to enrich the soil from the chemical and bacterial standpoint, and to improve its physical condition. Stable manure, of course, consists of the excreta of animals, and may or may not be combined with any material used as litter or bedding, such as straw, &c.

Both green and stable manures have a high value because of their effect in increasing the organic content of the soil, an effect particularly important in districts with a dry summer climate. Inorganic chemical manures supply plant food either directly, or in an easily convertible form, without adding to the organic matter or humus content. This difference between natural and artificial manures can be better appreciated by reference to the previous article on the importance of good physical condition of soil for the potato crop.

Owing to the fact that continuous housing of stock is not practised in this State, farmyard manure is not available for application to land in sufficiently large quantities to treat large areas. Even at the present time market

gardeners, who operate mostly in proximity to large towns where many animals are stabled the year round, have difficulty in obtaining sufficient for the requirements of their comparatively small areas. Consequently, where organic matter or humus is scarce, reliance must be placed on the growing and ploughing under of crops for green manure. Already there are certain potato districts in Victoria the soils of which, through constant cropping, have become practically depleted of vegetable matter. Soils in this condition are difficult to work and maintain in a condition of good tilth. They are consequently expensive to operate, and considerably reduced in moisture-holding capacity. They set into a "packed" condition readily, and seldom produce tubers of good shape except in very wet seasons. Until green manuring is brought into general practice on such lands, their physical condition cannot be efficiently improved.

There are various crops which, because of their comparatively low cost of production, and their capacity to produce in material quantity the essentials required for soil improvement, are suitable for employment as green crops. The principal of these are, in order of importance—rye, peas, oats, barley, and mustard. All of these are good individually, but probably the best green crop is a mixture of rye grain and peas sown at the rate of 1¼ bushels of rye and ¾ bushel of peas (ordinary dun) per acre. This combination has in its favour the capacity of the rye to produce an immense bulk of green stuff to the acre, in conjunction with the capacity of the peas to build up the nitrogen content of the soil. Mustard is a very useful crop for use as green manure, but care must be taken not to allow it to go to seed, otherwise it is likely to become a pest. Its particular value lies in the quickness of its growth, which allows of its being usefully employed where time does not permit of the growth of a heavier producing but slower-growing plant. It should be sown thickly, say, 20 to 25 lb. to the acre. At this rate of sowing, and given good weather conditions, it will smother almost any weed, and leave the land in a clean condition.

The most suitable time to plant mustard is the spring, for the following reasons:—If sown in, say, late August or early September, it should be ready for ploughing down before the end of October. Owing to its sappy nature, it soon decays, and will be ready for the late November and early December planting, which is the time of planting of the bulk of Victoria's late potato crop.

The rye and pea combination, as well as oats or barley, should, of course, be autumn sown, the earlier the better. The best time to turn under the rye and peas is when the shot blade in the rye makes its appearance. At this stage, the plant has attained considerable bulk, and is at about its highest degree of succulence. This succulence is important, as, if turned under at that stage, decomposition follows very quickly, which is desirable. No difficulty need be found in the complete burial of the rye and peas if a mould-board plough is used.

A moderately light chain should be attached to the near end of the plough rack, of sufficient length to reach beyond the tail of the mould-board. This chain, dragging in the furrow,

Crop grown from immature seed (left), compared with ripe seed (right).

Immature and ripe seed at Leongatha. Note stronger growth of immature seed in background.

with the weight of the overturned soil on it, curls in the green stuff growing on the sod, and effectively covers it. Should the weight of the chain of itself be insufficient to effect the covering, a plain elongated iron weight can be attached to increase the drag. Rolling after ploughing in green stuff is helpful in hastening its decay.

It should be stated here that if the stems of the rye are allowed to become too dry and fibrous before being ploughed in, the object for which the crop was grown will be defeated, particularly if the weather following ploughing be dry.

In all cases where a crop is sown for use as a green manure, it should receive 1 cwt. or 1½ cwt. of superphosphate per acre in order to promote rapidity and volume of growth.

Occasionally growers have ploughed under what was practically a straw crop, with most harmful results when a dry season followed. In such cases, insufficient moisture was present to permit the decomposition of the straw, and the land remained puffed up with this bulk of dry material, to the detriment of the potato crop following.

Formerly a grass and clover mixture was considered an excellent green manure for a potato crop. Unfortunately, however, clovers form an admirable host for eelworm (*Heterodera radicicola*), which has spread so much in late years, and which so seriously affects potatoes. For this reason it is generally inadvisable to follow grass and clover with a potato crop.

A comparative analysis of farm-yard manure and green rye is given below—

	Per Ton of Farm Yard Manure.	Rye.
Nitrogen ..	10 to 15 lb. ..	7.8 lb.
Phos. acid ..	4 to 9 lb. ..	4 lb.
Potash ..	9 to 13 lb. ..	16 lb.

The variations in the quantities of the nutritive elements in farm-yard manure are influenced by the class and age of stock, the kind of feed used, percentage of straw, &c.

A crop from selected Carman seed on new land at Beech Forest.

Young Farmers' Clubs.

Some Competition Impressions.

By A. J. Gill, Senior Herd Tester.

THE State-wide competition, instituted by one of our leading newspapers, to encourage and further the interests of the Young Farmers' Club movement in Victoria, has done much to convince many keen observers that, in addition to advancing a sound, wise policy of rural education, the movement is making vigorous, healthy growth.

The first club was inaugurated in Victoria only a few years ago, and to-day there is one in almost every country district of any consequence, while the formation of clubs in other centres waits only upon the appearance of some one enthusiastic and energetic enough to give them a start.

In this competition, the children's work was judged both in and out of school. They were questioned on the different branches of farm work, and in the care and judging of cattle, sheep, poultry, and pigs; while the number of projects undertaken by the club, the methods of tuition, and the manner in which the work was conducted were reviewed. This was made possible by examining the clubs at their own centres, an innovation which it is believed has not been carried out previously in any other part of the world. The visits were the first of their kind, but the results were highly satisfactory, and a great stimulus was given to the movement.

Clubs were encouraged to add to the projects already agreed upon, with the object of embracing every phase of farm work, both indoor and outdoor, which includes study of pasture development, cultivation of the soil, growing various crops, conserving fodder, feeding stock, care and judging of all farm animals, carpentry, horticulture, and growing of vegetables. Many home activities, such as cookery, sewing, fancy-work, and decorative work are an important feature in the girls' section. Of course, girls as well as boys take part in the outdoor work, but the clubs, quite cognizant of the important part played by the home in farm life, have included many of its activities in their list of projects, of which a number, such as wirework and metalwork, are done by both boys and girls.

Judging the winning club (Scotsburn), the judges were impressed by the fact that all work both inside and outside the school building was done by children, and managed by children, who had been taught to think and act for themselves. Contact with these children convinced one of the strong personality they had developed. Each child had a good grasp of the work. For example, one girl had a flock of Dorset Horns, which she could handle and judge as well as many an adult breeder. Last year at the Ballarat Show she was awarded 100 points, the highest number possible. The boy student, who gave an excellent display in judging Jerseys, was an equally capable judge of pigs, while another student—a girl—who judged Jerseys, could judge pigs and fowls also.

Each child owning a calf or a cow was quite a good judge, and could explain the peculiarities of that particular breed, as well as how to feed them, and prepare them for the show. They could handle them in a capable manner, and showed ring ability equal to that of adults.

In their garden, each child had his or her own plot of land, which varied in size, according to their ages. They have to work the garden themselves, and that they managed it very successfully is proved by the fact that £28 profit was made from it last year. The exercises and note-books were of a high standard, one being of exceptional merit. Each child of the Scotsburn club had a bank account varying from £10 to £95.

Another outstanding club is that at Newlyn. This was the first Young Farmers' Club to be formed. Here, too, there is a fine example of the result of the club work, one boy having started a poultry farm, erecting his own sheds, &c., and is setting out to earn his own living. In this club, the children, besides studying the usual farm and home matters, study the nature of the land in their district, and make plans of the contour of the country. They also have taken up animal drawing to train the eye, and assist them to become capable judges of stock.

Haddon has quite a wonderful club. This school is situated in very poor mining country, and the surrounding land seems altogether against successful club activities, but the great enthusiasm and zeal of teacher and children have created a fine club, which has for its motto, "United we win." Last November both shields at the Ballarat Show were won by Haddon.

Some of the children are excellent stock judges, and one little girl of thirteen carried off the honours in judging Jerseys and fowls, also for the best exercise book at the last Ballarat Show. She is, probably, one of the finest child judges of stock in the State.

That Warrenheip Club, winners this year of the Home Project Shield at Ballarat, possesses initiative is shown by the fact that, when the teachers and children found they had insufficient funds to purchase a milk-testing plant, they manufactured one from an old separator, and made quite an excellent machine.

Club's Rapid Growth.

At Newstead, perhaps, we have the most striking example in Victoria of the rapid growth of a Young Farmers' Club. Though only twelve months in existence, this club was placed third in the competition. The children own almost 50 head of fine pure-bred stock. The quality may be judged by the fact that they were able to compete last year in surrounding shows, and defeat the old breeders.

One of the children had over 200 single exhibits in the competition. That the enthusiasm of the competitors is shared by their parents is demonstrated by the fact that on judging day there was an attendance

The Pride of Ownership.
A member of the Sunny Creek Club with his Illawarra calf.

of over 300. At the show last October, over 600 people attended. The club has a fine collection of grasses, clovers, weeds, and insects, also woodwork and wirework. Experimental plots are conducted. The stock consists of cattle, sheep, pigs, fowls, and pigeons. Mr. Ellis, the teacher and club leader, who has just retired, regrets that he did not commence club activities twenty years ago. In the short time he has been associated with the Newstead Club, he has accomplished wonderful work.

Members of the Newstead Club with their Prize-winning Jersey Heifer.

Yarragon Club, which gained second place on the list, has a large number of useful projects, embracing all manner of farm work. It is a very strong club, the stock are good, and home projects play a big part. The children study export and import figures and market prices of produce at home and abroad; also climatic conditions, farm hygiene, and finance. One of the features of their list is to take an imaginary farm which is bought for a certain amount, the money is borrowed, and each month teacher and children reckon up the outlay, income, and interest due, to see if they can meet it. A plan is made of the farm showing the method of subdivision. This method is being adopted in quite a number of schools, and is very instructive.

At Sunny Creek there is, perhaps, the largest herd of pure-bred stock, in proportion to the number of members, of any club in Australia. Though only a small school, they own over 70 head of pedigreed animals. Here, as well as having experimental plots, a little stack of silage is made in the school ground, and a valuable lesson taught in fodder conservation.

The committee at this school has signed a guarantee which allows the club to draw up to £200 for the purchase of stock, the children repaying in instalments. Most of the children have the foundation of good pure herds. As the club has been operating for some years, some of the children own quite a number, and, on leaving school, will be able to start themselves on a farm. One little girl's two-year old heifer produced over 400 lb. butterfat in the Government Standard Herd Test in 1932. This gives one some idea of the high standard of stock introduced and what splendid work is being done by the clubs.

At the Bundalaguah State School the teacher has adopted the novel idea of having a small farm on a tray 6 feet x 4 feet containing soil. The young children of the first and second grades conduct this little farm. It is so arranged in the school building as to get the light from the window. A small house stands at one end, with made pathways, and the plot is divided into small beds, in which are grown clover, grasses, oats, and wheat. The children plant the seed and watch it grow, and are commencing to learn at a very early age something of how crops are grown and, in addition, they are developing a love for the soil.

The Kardella Club members are building up fine pure-bred herds and branching out into other lines. At Woodleigh, also, there are many fine animals, while right along the South Gippsland line there are other promising clubs.

At Fosterville is evident the result of energy and determination. The teacher wanted good stock. He went to the Royal Show, and after discussing the matter with several breeders, purchased six pure-bred Jersey calves. The terms were, a small deposit, and the remaining amount at 2s. 3d. per week on each calf.

Members of the winning Club at Scotsburn.

The animals secured are of very fine type, and the breeder who supplied the calves has become so interested that he is supplying two pure-bred bulls. Later more pure-bred calves will be purchased, but the foundation of six pure-bred herds has already been laid, and the enthusiasm of the parents aroused. This teacher has built a poultry shed in the school ground, and the children conduct it as they would a poultry-farm.

Ballendella Club makes a specialty of pasture plots, has a very fine herd of pure stock as well, and has done splendid work. There is a special committee for the purpose of selecting the stock for the children, and the results speak well for their work.

Local Interest Shown.

One pleasing feature of the competitions, and one that was taken into consideration when judging, was the assembling of residents, parents, and committee, at the school to give what assistance they could. This showed that the interest of the people had been aroused, that they realized the value of the movement, and that the club work was being carried out on correct lines.

The Ballarat Orphanage affords a striking illustration of the value of club work. Since pure-bred cattle, pigs, fowls, and club work have been introduced, and during the last year, there has been a greater demand for boys than the Orphanage authorities can supply, some requests having come from outside Victoria. At the Royal Show a large number of pure-bred stock are handled by these boys, while some are managing and others helping to manage valuable herds.

An admirable ideal is that every farmer be capable and scientifically trained, and that every herd of stock be a valuable and pure-bred one, and club work is helping to bring this about.

How to form a Club.

To form a club, the school teacher or other interested person in the district should call a meeting of parents, members of the local agricultural society, leading business people, and, where possible, the district school inspector.

The prospective activities and objectives of the club should be fully explained. Usually it is found that such meetings are very enthusiastic. The names of children over eight, and to whatever age the meeting decides upon,

who wish to become members, would then be taken. Usually the head teacher of the local school attends to these matters, and almost always acts as secretary. A committee of residents is formed to assist in the work, and in obtaining the necessary pure-bred stock.

Next should be appointed a club leader, who is usually the head teacher, because of his influence with the children. If the teacher is the club leader, he is in a position to supervise the record books, and can also arrange for the ordinary school work to become associated with the club's activities, which helps to bring school and home life into closer relationship. In this way, school tasks become more attractive, and besides advancing the child's knowledge along fresh paths, make the less natural work more agreeable, and frequently children who before the association of ordinary school work and club work were indifferent students, have afterwards become enthusiastic and diligent.

It is advisable to establish club meetings for boys and girls. A secretary and president are elected. The secretary would remain in office for an indefinite time, but a different boy or girl should be elected to the chair at each meeting. These meetings serve a dual purpose in that the debates and discussions brought forward advance the knowledge of the children, and also educate them in the conduct of meetings. These meetings, held on strictly formal lines, help to give a sense of social responsibility which is of great benefit to the children in after life.

Every attention should be given to the compilation of record books, where young farmers' competitions are held, and the schedule should be set out, and all matters concerning club work should be entered in them.

The Young Farmers' Club movement is now so widespread that information required should be readily obtainable from clubs already operating, or may be obtained from the Director, Department of Agriculture, Melbourne, C.2.

A young member of the Yarragon Club gives a demonstration of harrowing pastures.

["*Australasian*" *Photos.*

Quality in Bacon

The Need for Grading

By A. J. Gill, Senior Herd Tester.

IN creating and holding a market for any produce, the main factors are the quality and uniformity of the article offered. It is necessary to study the consumer's likes and dislikes, and having found what he requires, to supply that want, keeping to that standard as nearly as is possible, for it must be understood that while it is often very difficult to dispose of low-grade produce, that of high quality usually will create its own market. All consumers look for good quality, but frequently we find much harm being done through low grade, and inferior produce being placed on the market without any description as to its quality. Consequently the demand for that article is reduced or, perhaps, destroyed.

Statistics show that the consumption of pork and bacon in Australia amounts to 11.5 lb. per head of population; whereas in Canada it amounts to 87.7 lb. per head; in U.S.A., to 79.2 lb.; Germany, 62.8 lb.; France, 46.0 lb.; Britain, 41.8 lb.; Denmark, 37.3 lb.; Belgium, 29.2 lb.; and New Zealand, 28.3 lb.

It need scarcely be stressed that these figures cannot be regarded as encouraging, and are certainly not very complimentary to pig breeders. Many reasons may be advanced for this relatively small consumption, but the one that stands out most obviously is that we are not putting on the market what the people will buy, and what they are asking for.

Canada consumes the largest quantity of pig products per head of population. Some years ago Canada exported large quantities of bacon, and, to secure a footing on the English market, began to improve her pigs. This improvement set up such a great local demand that shortly there was very little to export.

Denmark's Example.

Denmark has secured a firm footing in the English market because of the high standard and uniformity of type of her pigs. There, bacon is graded and paid for according to quality. When Denmark set out to capture the English market, she studied the requirements

A side of good bacon. Note the even layer of back fat.

of her customers. She had many different breeds of pigs, and wanted to produce the best bacon in the world. With this object firmly in mind she got rid of the many breeds she then had, retaining only the Landrace. She then imported the Large Yorkshire breed and crossed it with the Landrace, carefully testing her pigs and thoroughly grading the bacon, thus maintaining a high standard.

That this sound policy has borne fruit is attested by the fact that a few years ago Denmark's bacon trade amounted to £19,000,000 a year. Without their rigorous grading and careful study of their customer's requirements, the Danes would never have obtained and held their footing in the English market. They graded their bacon and paid for quality, and they studied not their own particular fancy, but what the consumer required.

In Victoria we have seven or eight different breeds; and it is quite possible that we may have more in the course of the next few years. Each breeder thinks his breed is the best, but, unfortunately, the consumer is not always of the same mind. We make little effort to standardize our bacon, and no effort to grade it. Some little time ago the writer purchased some rashers of bacon, and paying top price for them should have secured the highest quality. Instead the bacon was old and hard, and the flavour unpleasant, and it could be classed only as a very inferior product.

Types in Most Demand.

Ham and bacon properly cured from correctly-fed and well-bred pigs are certainly the tastiest and most appetising of all meats. A few years ago some pigs that had been fed under Departmental instructors were cured at a local factory, and some were placed in a local shop for sale. A man who was in the habit of purchasing a few rashers every evening as he went home, was served from this bacon, and the next evening he inquired if any more of it was available. Upon receiving an answer in the affirmative he astonished the storekeeper by saying he would take the lot. This one instance is typical of many, and it is quite evident that good bacon would soon create a market which second and third grade produce is now killing. The average customer judges by the price, and does not know he is buying an inferior article. It is, therefore, very necessary that steps should be taken to protect both consumer and breeder by careful grading.

We can produce more bacon than we can consume in Victoria, but yet considerable quantities are imported from other States. If this imported bacon were all of highest quality it would not do very much harm, but when it is

A side from a badly-shaped mongrel pig.

of inferior quality and sells for 2d. per lb. less than local bacon, it certainly has a damaging effect, in that it does not improve the demand, and it depresses the market price, enabling the farmer's pigs to be purchased at a lower figure

than would otherwise rule. Those responsible, it would seem, have not sufficient vision to see that they are ruining the industry on which they depend for a living, and that the few extra shillings gained to-day will mean the loss of pounds to-morrow.

The pig industry is worth saving and encouraging. It means £1,500,000 to this State annually, and may be developed to the extent that it will be worth five times that amount. To improve it, the first thing to be done is to raise our standard to ensure that payment will be made according to quality, and that when a customer asks for good bacon he will get it. All second and third grade bacon should be marked indelibly, so that it will be impossible to sell one rasher that does not bear that mark. We must grade, and make that grading compulsory. If we are to develop our home market and obtain a footing in the markets of the world, we must have high-class quality and an even standard, and we can get that only by rigid grading. The demand at the present time is for a lean, tender bacon, not over-fat. The thickness of back-fat, according to the weight of first-class carcasses, should be as follows:—

Dressed Weight.	Thickness of back-fat.
60 to 100 lb.	up to $\frac{1}{2}$ inch thick.
100 to 130 „	$\frac{1}{2}$ to $\frac{3}{4}$ „ „
130 to 160 „	$\frac{3}{4}$ to $1\frac{1}{2}$ „ „
160 to 180 „	$1\frac{1}{2}$ to $1\frac{3}{4}$ „ „
180 to 210 „	$1\frac{3}{4}$ to 2 „ „

The back-fat should be even and in the perfect bacon type not more than $1\frac{1}{2}$ inches thick, with no pronounced thickening at the shoulder.

A good side should be long, of fair depth, with the underline straight and thick throughout, and free from wrinkles. Thick streaks of fat should be absent from the visible portions of lean. Indications of lean must be visible between the ribs. Shanks should be fairly short and of fine bone. Flesh should be carried well around the bone down to the hock and knee. The hams should be well fleshed and of good type. There should be no bareness inside the thigh. The vertebrae should be a flesh-pink colour and flinty in texture. The proportion of lean to fat must be good, and the fat perfectly white and firm. The flesh must be fine-grained, of nice colour, and tender and juicy; not rough, fibrous, flabby, or dark in colour. The skin should be thin, fine, smooth, pliable, free from wrinkles, with deep-seated bristles, and seedy cut, and lily white in colour, while the shoulder

A side showing too much fat. Note the thickening over the shoulder.

should be comparatively light. Attention is also directed to the length of the middle—that portion between the third rib and aitch bone—which is of great importance. Throughout the year there is a great demand for bacon rashers and this portion supplies them. Consequently the middle may be said to be the most important feature. Next in importance is the ham, which is in strongest demand at Christmas time. The shoulder is the cheapest and least sought after portion.

Glancing through the dressed sides of bacon in a factory one sees a great variety, which seems to point to carelessness in selection, and it is maintained by some that we should commence by grading the pigs alive.

Grading in Canada.

In Canada this scheme seems to have given satisfaction. The Canadian hog-grading scheme provides for the compulsory observance of the grade specifications. It was introduced to quicken the improvement of pig production, and had its origin in the realization of the relative inferiority of Canadian bacon on the British market. It requires that all hogs marketed at public sale-yards, abattoirs, and such points as are designated from time to time, be sold according to official grades established by an Order in Council, and which came into operation on the 1st May, 1922. Four district hog graders located in the main centres are responsible for the supervision of 21 local hog graders, attached to various stock-yards and packing plants. A feature of their duty is to give demonstrations when they are not required for grading services. Further, a permanent Board of three, consisting of one representative of the packers, one of the producers, and one of the Department of Agriculture, has been set up to study the problem relating to production, and the marketing of hogs and hog products. There are nine officials grades, viz.:—

Grade 1.—Select bacon—live weight 170 to 220 lb. at sale-yards or abattoirs, or 180 to 230 lb. after being fed and watered. The type and finish must indicate suitabality for production of choice bacon. Jowl and shoulder must be light and smooth; back from neck to tail evenly fleshed; side long, of medium depth, dropping reasonably from back; ham full; good general finish, and no excess fat.

Grade 2.—Thick, smooth.—Hogs weighing 160 to 210 lb., empty, or 170 to 220 lb. fed and watered; not conforming to select bacon standard, but of smooth conformation and finish.

Grade 3.—Shop hogs.—Weight 120 to 160 lb. empty; 130 to 170 lb. fed and watered; of smooth conformation and finish.

Grade 4.—Heavies.—Hogs weighing over the maximum weight for select; thick, smooth, up to 260 lb. empty and 270 lb. fed and watered; of select bacon, or thick, smooth conformation and finish.

Grade 5.—Extra Heavies.—Over 260 lb. empty or 270 lb. fed and watered; of smooth conformation and finish.

Grade 6.—Feeders.—All unfinished hogs of any weight and type of smooth conformation.

Grade 7.—Roughs.—Hogs of rough conformation, any weight.

Grade 8.—Sows.—All that have raised one or more litters.

Sub-grade A.—Those of smooth finish; trim underline, weighing up to 350 lb. empty.

Sub-grade B.—All other sows.

Grade 9.—Stags.

To encourage quality production a premium of 10 per cent. is paid on all select bacon pigs over and above the price of the thick smooths, (Grade 2), which is considered the basic rate. This compulsory grading of all hogs sold or offered for sale has tended to generalize sale by grades, to encourage unofficial grading by farmers and buyers, and to popularize transactions on a graded basis, with beneficial results to the industry generally.

Points for Breeders.

The following points may be helpful to breeders:—

Head, neck, and jowls should be light; their selling value is small compared with the remainder of the carcass. There should be no rolls of coarse fat at the jowl or over the neck, and no depression between the hams, at root of tail, as this indicates excessive fat. The pig should be full and firm behind the elbow, and the flank, which should be thick, should handle firm. The streak cannot be too thick as long as there is a proper proportion of lean to fat. The back-fat should not exceed 1½ inches in thickness, preferably throughout the whole length. Fineness of bone is of great importance; it denotes quality, and does not

detract from weight. Seedy cut is a serious blemish, and may necessitate cutting away a few pounds of a valuable portion. There is no seedy cut in Danish pigs; they are all white. However, while it certainly is possible to reject, when alive, a number that will not make good bacon, there is always a percentage that, while apparently quite good specimens when alive, will be rejected when dressed; and it is only in the dressed article that we are able correctly to judge and grade pigs.

The Danes, in order to lessen the loss when grading, adopt a system of testing the pigs thoroughly, not only to discover quick-fattening qualities, but also to produce the correct type. One of a litter to be used for breeding is fattened, killed, and cured, cut up and tested. This is very necessary to ensure that too much back-fat is avoided, that there is also a good proportion of lean in the streak, and that the flesh will be palatable, tender, and appetising. It is by such testing and grading that the Danes made their reputation, and if we wish to reach such a standard we also must grade, for, not until we have a system of grading will the product sell according to quality; and the more rigorous our grading the higher the ultimate standard of our product. A farmer would then find that, in order to obtain top price, he must put good animals on the market, and he would also have the satisfaction of knowing that good animals would command the highest prices. But he will not, and cannot, expect to reach a high standard which would create a stable market here and abroad, unless he adopts a grading system such as that described.

If we could put an even type of pig on the market, we would help the bacon curer to produce a uniform article. At present one may see in a factory an array of sides that might be classified into several grades. The short, heavy shouldered pig, the coarse boned, the coarse fleshed, the dark fleshed, the slop-fed, soft, flabby pig, and the over-fat pig are too much in evidence. The number of first-grade sides offering is too few.

These inferior types are doing the industry much harm, and if, as before stated, we were to have all inferior bacon marked indelibly before leaving the factory, the sale of the inferior product would become difficult, and the breeder, finding certain types unsaleable, would cease to produce them. Further, bacon that has been kept for long periods in a shop frequently deteriorates, loses its bloom and freshness, dries and develops a stale flavour, so that if the date when bacon left a factory were stamped on the sides, and it became known that after, say, three weeks, bacon could no longer be classed as first grade, the sale of the stale article would be prevented or, at least, the purchaser would be aware of the fact that he was buying stale produce.

A thin side—suitable for use as rolled bacon.

Winter Work in the Orchard

By Frank M. Read, M.Agr.Sc., Senior Horticultural Research Officer.

WINTER is the "odd job" season of the year for the orchardist. Freed temporarily from the routine of cultivation, spraying and harvesting, he is able to turn his attention to those tasks which I have referred to as "odd jobs," but which, as we know, are really of first importance. In this short article it is proposed to touch briefly on these tasks without any great regard for their order of importance.

Orchard hygiene is the first point we will consider. During the season just completed, apple and pear growers have enjoyed comparative immunity from Codling Moth; but in most districts the late broods were much more in evidence than the earlier ones, and there can be little doubt that, unless care be taken, the carry-over of pupae this winter will be well up to the average in point of view of actual numbers.

Codling Moth bands on the trees should now be inspected for pupae, and a careful search under loose bark and in the crotches and crevices of the trees will be amply rewarded by reduced infestation next spring. Fallen fruit should also have been gathered and disposed of. This is all the more necessary, because we must expect a much smaller crop next year than has just been experienced, and it is under short crop conditions, usually, that Codling Moth control is most difficult.

A second point of importance is the growth of greenstuff in the orchard during the winter months. Unless the orchard is now covered with a good bank of natural herbage, or, better still, a sown green crop, it is not receiving the treatment it deserves. Undoubtedly the most important item in the maintenance of soil fertility is the ploughing under of organic matter for the supply of humus. This can be provided by the application of farmyard manure or to a less extent by other organic manures and by the ploughing under of straw, but none of these measures can be as economical as growing the humus *in situ* and ploughing it in as greenstuff.

It is, of course, too late for a green crop to be sown this year, and the question is raised only because the present is an excellent time to take stock of the situation, and decide upon a future policy. It is realized that the dryness of the autumn has greatly reduced the growth of natural herbage; but this should have made fair growth during the last month despite the earlier lack of rain. Where growth is unsatisfactory, this is probably due to one of the following reasons:—

1. The late autumn ploughing given by many growers prevents winter growth. Where this is so, it is recommended that the autumn ploughing be eliminated, and provision for surface drainage made by working to the tree during summer, and so leaving a depression in the centre of each land. This has been tried during the last year or two by leading growers who declare that it works out well in practice.

2. The absence of winter growth may be due to the necessity for autumn applications of manure. This can be checked readily by the grower by simply spreading separately on small trial areas, such manures as super. (say, 2 cwt. per acre) or sulphate of ammonia (1 cwt. per acre); or, where the soil appears sour and grows sorrel or other acid-loving plants, lime at the rate of 10 to 20 cwt. per acre. If these compounds are necessary or desirable on the orchard, a marked response in the growth of the herbage should be noted. In such a case a yearly application of the required fertilizer should be given in early autumn or with the green crop if one be sown. Lime, at the rate suggested would be necessary only one in every three or four years in most cases.

3. Scanty growth in a healthy citrus grove may be due simply to the competition of the trees with the smaller plants for water and mineral nutrients. In such

a case the ploughing in of straw is to be recommended, for it is here impossible to grow a successful green crop or stimulate the natural herbage sufficiently by the additions of fertilizer.

In addition to its effect on soil humus, the greenstuff will certainly keep the soil drier than it would be under clean cultivation. This is usually a great advantage in districts of liberal winter rain. Growers have sometimes questioned the truth of the above conclusion, saying that they find the soil wetter under the greenstuff than under the clear patches; but their opinions usually are based on observation of the first foot of soil only. It may be true that the condensation of dews, and the sheltering of the surface from wind and sun by the green plants do bring about higher moisture in the surface layers under crop than under clean cultivation, but in the second foot of soil where the greatest concentration of the tree roots occurs, and in the layers of soil lower still the soil will be found drier under the crop.

The necessity for early ploughing under of green manure is a point that may be stressed. Where the ground is in a fit condition to take the implements, six weeks to a month before blooming, the greenstuff should be turned under at this period. Unless this be done, the crop will compete with the trees for water and nitrogen at the critical blossoming stage.

A useful odd job that orchardists could undertake this winter is the construction of a portable incinerator for the burning of prunings. Growers fail to realize that the annual prunings contain an appreciable quantity of minerals which the tree has removed from the soil—a quantity which may often be in excess of that removed by the crop of fruit. It is obviously desirable that these minerals should be returned to the soil; and the best way to do this is to burn the prunings as they are gathered in an incinerator erected on a sledge or on wheels and drawn by a horse through the orchard.

Irrigation ditches should receive an annual winter overhaul. On many irrigation blocks the head ditches are the weak spots. We often acclaim the virtues of the economical use of irrigation water, and speak as though the grower has but to decide on an improved method and then go out and put it into operation. It is usually found that faulty irrigation is associated with a faulty lay-out of irrigation ditches—either their capacity is insufficient for the area watered, resulting in slow and wasteful irrigation, or the ditches are too far apart, and the irrigation run consequently too long. These matters are often realized in the irrigation season, but are forgotten the following winter, which is the only season in which alterations can conveniently be made.

Cracked concrete ditches and leaking outlet pipes are not only annoying; they are serious. Such channels can lose as much water by percolation as an earthen ditch, and this is the time of the year to correct them. Where extensive breaking has occurred the sections should be cut right out and re-made. Where isolated cracks are to be repaired, the most satisfactory method probably is to fill the cracks and paint the surface with one of the proprietary preparations of bitumen which can be applied cold.

A final brief injunction is that growers should guard young trees from rabbits and hares. In the north of the State where these vermin are at present numerous, there is a very real danger of serious damage from this source just about this time of the year.

Household Insects and their Control

Insecticides and Fumigants

By C. French, Junr., Government Biologist, and R. T. M. Pescott, M.Agr.Sc., Entomologist.

NUMEROUS kinds of insects are to be found in houses, attacking both the inhabitants and the materials which go to make up the home. For example, some insects (such as flies, mosquitoes, and fleas) attack human beings, and are capable of disseminating disease; others (such as clothes moths, and silverfish) attack clothing and house furnishings; whilst others (such as timber borers and white ants), may attack the woodwork and furniture of the house, causing, in extreme cases, the collapse of portion or the whole of the home. Others again (such as houseflies and blowflies), infest foodstuffs, and while, in some cases, they may render the food unfit for human consumption, they also, by contaminating it with bacteria and other organisms, may assist in the spread of disease, thus endangering the health of a household. It is the purpose of this series of articles to set out as much useful information as possible concerning the commonest of the household insects, together with methods that may be adopted to assist in the control of these pests.

General Recommendations.

Care and cleanliness in housekeeping are of prime importance in preventing or reducing insect attack. Woollens, furs, and other such materials likely to be attacked by clothes moths, carpet beetles, &c., should never be left lying about unprotected, particularly in the period from November to March, as it is then that the adults of these insects are most commonly found. Carpets and rugs should be raised and beaten at regular intervals, or periodically cleaned with a vacuum cleaner. Cracks between floor boards, and crevices behind skirting boards and in cupboards, which harbour dirt and dust, and serve as a refuge and breeding ground for such insects as fleas and silverfish, should be eliminated as far as possible. Foodstuffs should be carefully protected from the attention of flies, and the attacks of such insects as cockroaches and ants. Clean personal habits will eliminate human body-parasites such as lice, while regular washing and proper care of domestic pets will destroy fleas. The use of fly-wire screens on doors, windows, and chimneys will exclude many pests, while the careful examination of any timber and furniture, particularly of second-hand material, will assist in keeping down the ravages of timber borers. Regular inspection of and attention to all furniture should be the rule.

Such cosmopolitan pests as houseflies, blowflies, and mosquitoes, may be largely reduced in numbers if intelligent use is made of the knowledge of where these pests breed. To deal effectively with these insects, however, individual efforts are not likely to yield very encouraging results, apart from alleviating purely local outbreaks, but organized community efforts can accomplish a great deal in reducing or preventing an outbreak over a large area. When pests have become established in a household, there is a number of ways in which they may be eliminated or kept to a minimum. Such ways include the use of fumigants and other insecticides, improved housekeeping methods, and the treatment or elimination of breeding places.

Insecticides and Fumigants.

In the later articles of this series, numerous references will be made to certain insecticides and fumigants, which are recommended for use in the control of various insects found in the household. The following description briefly summarizes the nature of the materials, their application, and the conditions under which they should be used.

Naphthalene.

Naphthalene is the most commonly used and safe material for preventing injury to clothing and other materials by clothes moths, carpet beetles, &c. It is obtained during the fractional distillation of coal tar, and is sold in the form of flakes, candles, or the commonly

known form of "moth balls." The best results will be obtained by using pure flake naphthalene, which costs, at the present time about 6d. per lb.

The fumes of naphthalene, when present in a sufficiently high concentration, are toxic to insects. As the fumes are given off very slowly, naphthalene is most suited to protecting materials in tightly-constructed trunks, chests, and over a long period of time. The most effective results will be obtained where about 1 lb. of fresh naphthalene is used for every 50 cubic feet of space. The naphthalene should be renewed at least once each year, preferably in the early spring.

Paradichlorbenzene.

Paradichlorbenzene (sometimes spoken of as P.D.B.), is often used instead of naphthalene for fumigation purposes. In nature it is a white and crystalline solid and, at normal temperatures, slowly vaporizes into a pungent gas. The gas is non-inflammable and non-poisonous to humans, but is definitely toxic to insects. It is useful in preventing insect injury to materials in gas-tight receptacles, in which it is used in the same quantities as naphthalene. But while proving equally as effective as naphthalene when used under similar conditions, the high price at which it is sold (approximately 3s. per lb.), makes its use possible only under certain specialized circumstances.

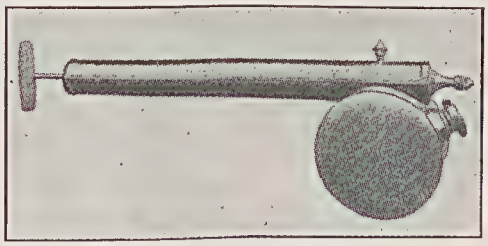
Sodium Fluoride.

Sodium fluoride is a fine, white powder, which is a most effective insecticide against such insects as cockroaches, silverfish, and ants. It forms the basis of many proprietary insect powders, and is applied by scattering or dusting in places frequented by these insects. Small particles of the powder adhere to the bodies and legs of the insects, and in endeavouring to clean themselves with their mouth parts, they are poisoned by it. Sodium fluoride, unlike pyrethrum, does not lose its effectiveness on exposure to air, and may be left in infested places until the insects have disappeared, or as long as is convenient.

Sodium fluoride is poisonous to human beings, but not extremely so, and if only a light coating of dust is applied to exposed places, there is no danger from its use. Children and domestic animals, of course, should not be allowed to have access to the powder.

Pyrethrum.

Pyrethrum, also known as Persian insect powder and Dalmatian powder, is a yellowish powder made from the finely-ground flowers of certain species of chrysanthemums. It has excellent insecticidal properties when fresh, and forms the basis of many proprietary insect powders and fly sprays. Its value as an insecticide lies in the presence of a volatile oil (pyrethrin), which on contact with insects kills or paralyses them. This oil deteriorates fairly rapidly on exposure to air, and it is, therefore, necessary to use fresh pyrethrum of good quality, and to store it in tightly-sealed containers if the best results are to be obtained.



A small hand-sprayer or atomizer.

Pyrethrum is harmless to humans and animals, and, therefore, is particularly well adapted for use under household conditions.

A very efficient spray for destroying insects in dwellings may be easily and cheaply made from pyrethrum insect powder and kerosene. It is prepared by adding one half-pound of pyrethrum to 1 gallon (8 lb.) of kerosene, allowing the mixture to stand, and agitating it at intervals over a period of about two hours, thus ensuring that all the active principles of the pyrethrum are dissolved. The residue of the pyrethrum settles to the bottom of the vessel as a brown sediment, and the clear liquid, which is pale lemon-yellow in colour, may either be syphoned or filtered off. For household use, to remove any possibility of staining fabrics or furniture, water-white kerosene should be used, and to impart a pleasant odour, methyl salicylate may be added at the rate of 3 fluid ounces to each gallon. The spray should be kept in a tightly-corked container to prevent it from deteriorating in strength.

To destroy flies and such insects, the spray should be applied in the form of a fine mist by means of a small hand-sprayer, using about 1 fluid ounce to each 1,000 cubic feet of space.

The spray gives its maximum results in a confined space, such as a room where the doors and windows are closed. The dead insects should be swept up and burned regularly.

Sulphur.

Sulphur fumigation has been very widely used for a considerable period, owing in part to the cheapness and availability of the crude materials, and the ease of the operation. Sulphur when burned in air produces a gas known as sulphur dioxide, which, while toxic to insects to a certain degree, possesses some objectionable properties. For instance, it tarnishes metals, and has a bleaching effect on wall papers and fabrics, particularly in the presence of moisture.

Because of the greater suitability of other methods, sulphur fumigation is now rarely used. The following information is given, however, for those who wish to make use of this type of fumigation:—All metal objects should be removed or smeared with a thin coating of vaseline or some similar preparation. The room should then be made as gas-tight as possible, by closing up all such openings as windows, chimneys, ventilators, &c. Open all cupboards and drawers, and place around the room a sufficient number of metal containers to hold all the sulphur, and yet prevent it from overflowing while the fumigation is being done. These containers should stand in a larger vessel containing a little water to prevent danger from fire. A small heap of charcoal should then be placed in the bottom of each container, ignited, and when it is burning well, the sulphur carefully added, after moistening with methylated spirits to facilitate burning. The door of each room should then be closed, and the room made as gas-tight as possible with newspaper or gumpaper strips. At least 2 lb. of sulphur should be burned for each 1,000 cubic feet of space, and the fumigation should proceed for from 18 to 24 hours. If the space to be fumigated cannot be made perfectly gas-tight, the amount of sulphur should be increased.

Hydrocyanic Acid-Gas.

Fumigation with hydrocyanic acid-gas is one of the most effective methods known of dealing with insects, and, moreover, it may be used without fear of injury to furniture, fabrics, and other household goods, and equipment. *However, when inhaled it is extremely poisonous to animals and human beings, and should, therefore, be used only by intelligent and careful persons, who fully realize its dangerous properties.* In order to safeguard against accidents while using this gas, it is usual for the fumigation to be done by two persons, each of whom should carry a small bottle of ammonia or ammonium carbonate, which is the recognized antidote for hydrocyanic acid gas poisoning. The materials used in fumigation should not be left where they are accessible to irresponsible persons or children.

Fumigation with hydrocyanic acid-gas should be attempted only in buildings that have been completely vacated. It would be extremely dangerous to fumigate partially occupied semi-detached houses, or single rooms, or apartments in occupied buildings. The temperature of the structure to be fumigated should be 70° F. or over, and not less than 65° F. Insects become dormant at low temperatures, and are less likely to be killed by

Sketch of bedroom showing drawers and cupboards opened in preparation for fumigation.

the gas. Best results are secured on a calm day, as the gas is apt to be dissipated in windy weather.

Preparations for Fumigation.—Measure the cubical contents of the space to be fumigated, including rooms, hallways, basements, and attics, in order to make an estimate of the quantity of materials required. Close all openings, such as windows, chimney places, ventilators, and outside doors, and stop up any cracks through which the gas may escape. Open cupboards, drawers, and trunks, and raise the carpets from the floor to allow the gas to freely penetrate to all places where insects may be in hiding. Remove moist and liquid foodstuffs. So that the building may be thoroughly aired before it is entered after the fumigation is complete, arrange that one or two doors or windows may be opened from the outside, if possible, on each floor. Before commencing the fumigation, make sure that the building is completely vacant, and arrange for the ready egress of the operators. As the gas is lighter than air, commence at the top of the building and work down. When all is complete, close and lock the outer doors, and post a warning to prevent persons from entering the building.

Calcium cyanide dust laid on newspapers running the full length of the room.

Two widely used methods of generating hydrocyanic acid gas for fumigating purposes are as follow:—One is the liquid or pot method, in which the gas is evolved from the action of sulphuric acid on sodium cyanide. The other, which is easier to apply and less dangerous than the pot method, consists in exposing calcium cyanide to the action of atmospheric moisture. The latter method is recommended as the more satisfactory of the two for use under household conditions, and will be considered first.

The Calcium Cyanide Method.—Calcium cyanide is sold in tightly-sealed cans in the form of dust or fine granules. Coarse-grade dust is recommended for the fumigation of buildings, and is applied merely by spreading it thinly on dry papers. It combines with the moisture in the air, evolving hydrocyanic acid-gas, and leaving a residue of calcium hydroxide (slaked lime). In applying it, the instructions and precautions given previously must be carefully followed. In order to increase the humidity of the air in the rooms, and thus accelerate the liberation of the gas, a little water should be sprinkled lightly about in the building an hour or two before fumigation. No surplus water should be on the floors when the calcium cyanide is distributed. The amount of material to use depends to some extent on the air-tightness of the building to be fumigated, and the insect species involved. For general purposes, however, 2 lb. of calcium cyanide to each 1,000 cubic feet of space will be found to be the most satisfactory. When all is in readiness, distribute dry newspapers around the floors of the rooms and hallways, and place in every doorway the required number of cans of calcium cyanide with the lids loosened. Commencing at the top of the building, scatter the calcium cyanide in a thin layer on the newspapers. Leave the ground floor and basement until the last and treat them simultaneously, the two operators meeting at the exit and leaving the building together. The building should remain closed preferably for 24 hours, and not less than 18 hours. After being thoroughly aired for at least two hours by opening doors and windows from the outside, the rooms may then be safely entered and occupied. The residue from the calcium cyanide should be rolled up in the papers and disposed of by burying.

The pot method of fumigation.—The materials necessary are sodium cyanide, 96-99 per

cent. pure, commercial sulphuric acid, water, and several large earthenware crocks, each of from 2 to 4 gallons capacity. Sodium cyanide is a deadly poison and sulphuric acid a highly corrosive acid, and great precautions are necessary in handling them. It is advisable to wear old clothing when fumigating with these materials, and to have a strong solution of common washing soda on hand with which to neutralize any of the acid which may be inadvertently splashed on one's person. The pot method of fumigation consists of dropping sodium cyanide into diluted sulphuric acid, hydrocyanic acid-gas being rapidly evolved, leaving a residue of sodium sulphate. The amounts of materials required for each 1,000 cubic feet of space are—

The pot method of fumigation.

Sodium cyanide—16 ounces by weight.
Sulphuric acid—24 fluid ounces.
Water—32 fluid ounces.

Place the crocks in a sink or bath tub. Pour in each the necessary quantity of water, afterwards carefully adding the acid, allowing it to run slowly down the side of the crock, stirring meanwhile. Never add the water to the acid. The addition of the acid causes the evolution of considerable heat, and if done hurriedly may cause boiling and splashing. Distribute the crocks in each of the rooms to be fumigated, placing them on thick layers of newspapers to protect the floors from any acid that may be spilled or splashed over. Weigh out the amount of sodium cyanide required for each crock, into thin paper bags. Place a bag beside each crock. When the directions and precautions described previously have been observed, and all is in readiness, commence at the top floor and drop the bags into the crocks. Do each floor in succession, working from the top down. Then close up all entrances to the building. Allow the fumigation to proceed for from 18 to 24 hours. Afterwards, the building should be well aired, and the residue from the acid and sodium cyanide disposed of down a drain or sink, or buried deeply in the ground.

(Further articles dealing with various household insect pests will be published in subsequent issues of the Journal.)

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.

Carnation.

The Flower Garden.

ATTENTION should be paid to ranunculus, anemone, Iceland poppy, stock, and wallflower borders, to see that the plots are kept healthy. These spring-flowering annuals are all attacked by a wilt which kills out individuals and spreads quickly to the rest of the plants. The plants should be dusted with copper carbonate, which checks the spread of the disease.

Carnations are now growing into the flowering stage, and in sunny situations old plants are flowering. The carnation must be grown in a light and free soil. If planted in heavy soils, it is advisable that a liberal dressing of sand be worked in around the roots. Carnations should not be given animal manure; they are not lovers of too much humus. If their growth is backward, a top sprinkling of superphosphate is all that is needed. Water should be kept away from the plants in winter; and a lime dusting is helpful at any time, both to the plant and to the soil. Tall, spindly plants should be pinched back, in order to make the plant stool out at the base.

In pruning flowering shrubs, be careful to prune only summer and autumn flowering types; spring flowering shrubs must not be pruned until they have finished flowering.

The Vegetable Garden.

Cabbage, cauliflower, turnip, and sprouts are often attacked by aphis at this season of the year. The plants, if attacked, should be well sprayed with nicotine sulphate spray. The soil should be kept free of weeds, and well hoed or worked around the stems of the plants.

Rhubarb may now be planted out. The roots of rhubarb are not very searching, and the food supply therefore should be placed quite close to the crowns. Rhubarb is a very gross feeder, and manurial supplies should be abundant.

Asparagus beds should be cleaned out, and well top-dressed, to encourage a good growth in spring. In late districts, onion planting should now be proceeded with. Seed should be sown in a free soil in rows or in the seed-beds, or seedlings should be planted out in rows 9 inches apart. Potato and tree onions may also be set out in rows. Onions like a good soil, which is deeply dug over, their roots often going down 2 or 3 feet. It is rather late in the warm districts to expect good growth from late planting of the white-skinned varieties; but the globe and brown varieties may be given attention.

The Orchard.

Pruning will now be in full swing everywhere. If grafting is to be done later, orchardists should select a good supply of strong scions for working. Under the new systems of re-working, which will be discussed

next month, orchardists need not fear any of the troubles previously experienced in the reworking of trees. The new systems give quick results in early crops, a free growth, and no fear from future troubles with polystictus fungus.

San José scale must now be attacked, as it is the winter spraying that checks the advance of this pest. The use of winter oils, combined with lime sulphur, is recommended for this pest.

The aphelinus parasite has done wonderful work in clearing orchards from woolly aphis. Many orchardists are not yet seized with the features of its life history; and consequently inquiries continue to come to hand, seeking supplies, in winter. The parasite is not moving at this time of the year. Spring time, in September or October, is the best time to transfer the wasps into affected orchards.

Hair Fibres in Wool

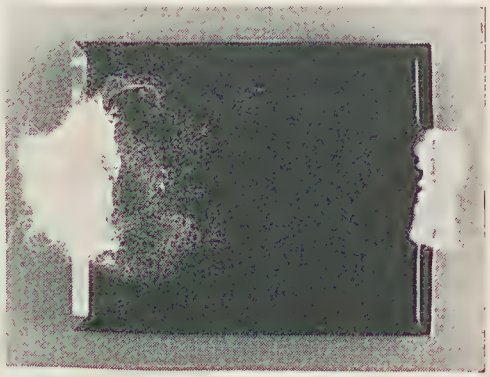
By N. A. Bowman, Sheep and Wool Expert

A DEMONSTRATION of the Benzol method of testing wool for hairiness given by the writer at the recent annual field day of the Ballangeich and Ellerslie Sheep Farmers' Association created so much interest that it was thought desirable to make the method more widely known among growers.

The test has the advantage of being both simple and foolproof, and is recommended for use in the field in doubtful cases during stud sheep classing operations. The equipment necessary consists of a small supply of benzol, some petrol, a photographer's black developing tray, approximately 8 inches wide by 10 inches long, and a piece of plate glass that will fit inside the tray with a clearance of about ¼ inch all round.

The equipment necessary for the test.

The sample to be tested is first washed or scoured in petrol, so as to remove all dirt and grease, and dried thoroughly. After being well teased out the wool is placed in the developing tray, into which some benzol is then poured. The plateglass is placed over the sample which, if it is pure wool, will appear invisible. If, on the other hand, hair fibres are present, these will show up as milk white strands.



The sample on the left contains hair fibres seen in the benzol, that on the right is pure wool.

The differences between wool and hair fibres are clearly seen under the microscope. Along the whole surface of the wool fibres are to be seen innumerable minute projections or serrations. The development of these serrations varies with the firmness of the fibre. The old idea that wool fibre is "hollow" in the centre, or has a central core, is incorrect. A true wool fibre is solid and made up of innumerable cells packed together. A hair fibre, on the other hand, clearly shows a medulla or central core, and has a comparatively smooth surface without the serrations which, together with the absence of the medulla or central core, give wool some of its most important properties.

Professional Papers

[This section is devoted to professional papers and articles of a scientific character.]

Distributing Action of Drills

By F. Penman, M.Sc., Assistant Research Chemist, Department of Agriculture, Victoria

CONSIDERABLE interest has developed recently in the distributing action of drills. The subject is of direct importance to the actual farming community, to manufacturers of implements and of fertilizers, and to agronomic workers concerned with technique of field plots and with variation in the factors determining yield. In this report, prominence has been given to considerations of possible importance in plot work and plant growth studies in small sections of row, and in addition to presentation of results obtained in Victoria, opportunity is taken to discuss the application to local conditions of certain relevant information published abroad. The present work was confined to examination of combined grain and fertilizer drills of the type in extensive use in Victoria for sowing cereals. For use in other investigations, information was required regarding the extent to which concentrations of fertilizer in small sections of drill row may rise above the average application, a consideration of special importance for highly soluble fertilizer.

Irregular distribution of seed is known to be characteristic of the action of modern seed drills(3). There is no evidence, for cereals at least, that such distribution is unable to produce optimum yields, indications being that ideal arrangement lies somewhere between clump sowing and regular spacing of single seeds(7). Investigation of the factors causing irregular sowing of seed, and the extent of the fluctuation, has been well covered by the work of Engledow and others, but for completeness certain tests of wheat grain distribution were made in the present work.

For fertilizer application, the situation is rather different. It is recognized that irregular distribution is partly responsible for inefficient utilization of fertilizer, and, in addition, there is the possibility of injury to certain seeds by local concentrations of certain fertilizers when both are sown together. Concerning the first point, Crowther(1) states that "in the long chain of controllable processes between purchase of fertilizer and sale of crop, the actual application of the fertilizer to the soil is probably one of the weakest links," while the United States Department of Agriculture estimates that the efficiency of application of fertilizers by drills is only about 50 per cent.

Most of the work described here was done with an implement in which the grain feed is of the cup type, and fertilizer distributers are made on the star pattern, with a "knocker" over the bottom plate vent, rates of sowing in both cases being controlled by gears, and grain and fertilizer being sown together by means of hoes. Except that it has only eleven hoes, this machine is typical of the class of implement in extensive use in Victoria for cereals. Examination of the design of many other drills and observation of their action leads to the belief that conclusions reached from detailed tests on this particular implement are applicable fairly generally to machines of this type.

The factors determining variation in drill output may be classified into those concerned with total average delivery, with differences in performance between individual mechanism associated with each hoe or disc, and with point to point fluctuation along individual rows. With regard to total average delivery, it is well known that different kinds of grain and fertilizer run at different rates through drills under the same conditions of speed-gear setting, &c. Thus differences in delivery between

pickled and untreated grain are recognized, and physical character has an important bearing on fertilizer output. A full investigation of the latter point has been made by Mehring and Cumings(6). Examination of certain other factors is considered below.

Output from Individual Hoes.

(1) *Fertilizer*—

During a series of shed tests to find suitable speed-gear settings for delivery of certain amounts of fertilizers, the output from each hoe corresponding to a sowing of one-twentieth acre by the drill was collected and weighed separately for each test. An aggregate of 31 tests using different fertilizers and various cog settings gave opportunity for detecting inherent differences in output between the various hoes. The total output from each hoe during the tests is shown in Table I. as a percentage of the mean value, the hoes being numbered from the off side.

TABLE I.—RELATIVE FERTILIZER OUTPUT FROM INDIVIDUAL HOES.

(Percentages of mean value.)

Hoe No.	1	2	3	4	5	6	7	8	9	10	11
Output	103	106	104	95	102	97	104	97	96	100	96

It was expected that differences of this order would be obtained, and they may be assigned to slight differences in structure and movement of the various stars and related mechanism. As shown in the table, the range of variation is as much as 11 per cent. of the mean output. While this is significant, it is a comparatively minor cause of local fluctuation in fertilizer application. Results of the same order have been obtained with a similar machine in U.S.A.(6).

(2) *Wheat Grain*—

Weighed outputs of grain from each hoe were obtained in a series of eleven shed trials under the same conditions with the same wheat seed. Individual deliveries from the hoe, and, therefore, total grain output, were closely reproducible in successive runs, the mean total delivery under the conditions being at the rate of 79 lb. 4 oz. of grain per acre, with a standard error for a single run corresponding to ± 7 oz. per acre.

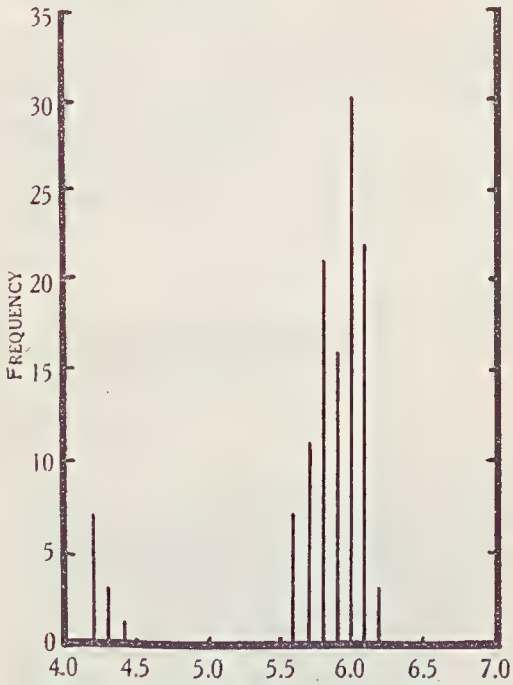


Fig. 1.—Distribution figure showing variation in delivery of wheat grain from individual hoes in successive tests. Segregation due to an abnormal distributing unit is illustrated.

The 121 figures for hoe output obtained in these tests for one-twentieth acre runs were plotted as a distribution diagram (Figure 1). This consists of a distribution of typical character ranging from 5.6 oz. of seed to 6.2 oz., with an outlier covering values 4.2 to 4.4. oz. The isolated section consists entirely of the eleven figures for hoe 3. The average extent to which the delivery from this hoe falls below that of the other hoes is shown in Table II.

TABLE II.—OUTPUT OF WHEAT SEED FROM INDIVIDUAL HOES.

Hoe No.	1	2	3	4	5	6	7	8	9	10	11
Average rate per acre (lb.)	7.4	7.5	5.3	7.2	7.1	7.3	7.6	7.5	7.6	7.5	7.2
Percentage of mean of all hoes	103	104	74	100	99	101	106	104	106	104	100

The individual outputs expressed as percentages of their mean show comparatively little variation with the exception of hoe 3,

and show the level at which most of the other hoes operate above the average application to make up the deficiency caused by hoe 3. The deviation of this hoe output from the remainder is such that abnormality is at once suspected. This was found by comparison of the various grain distributers, showing that in the mechanism for hoe 3 there was a thickening of the interior wall of the casting forming the sump in which the grain cup picks up the seed. This defect considerably restricted the flow of grain to this cup. Apart from decreased efficiency such a structural fault would not be important in most plot work involving complete drill widths, but would introduce obvious difficulty when single rows or combinations of rows within a drill strip were under comparison for any purpose.

Effect of "Head" on Output.

(1) *Fertilizer*—

Total output from the drill in one-twentieth acre runs in shed tests was determined, using superphosphate in sufficient quantity in the box to give depth above the stars of 6 inches, 3 inches, and 1½ inches respectively, corresponding roughly to the box full, half-full, and quarter-full. Six or more tests were carried out for each depth, all other conditions being constant. The mean output for each head of fertilizer, expressed as pounds per acre, is shown with its standard error in Table III.

TABLE III.—EFFECT OF HEAD OF SUPERPHOSPHATE ON DRILL DELIVERY.

Head.	Delivery per Acre.
6 inch	106 lb. 4 oz. ± 5 oz.
3 „	102 lb. 8 oz. ± 5 oz.
1½ „	100 lb. 0 oz. ± 8 oz.

It appears that head of fertilizer has a significant effect on delivery from this type of machine. The variations are sufficient to warrant attention for plot work. The necessity for testing and operating drills with a standard head of fertilizer for accurate plot work is obvious. The effect of differences in head is comparatively small for increases above that equal to the width of the fertilizer box at its base(6). On this account the desirability of working with a full box is stressed. With a small head of fertilizer there is a prospect of distributing fertilizer at a significantly lower rate at the end of a plot than at the beginning.

(2) *Wheat Seed*—

In a similar manner to that for superphosphate, the effect of head of wheat in the box was investigated for values of 8 inches, 4 inches, and 2 inches. As means of several closely-agreeing tests, deliveries expressed as pounds per acre were 81, 81, and 80 respectively. This demonstrates that with cup distributers of the type examined, head of grain may be neglected as a factor in distribution, provided there is sufficient to ensure a continuous supply to the cups. Similar results have been reported in England(2).

Fluctuations along Rows.

The work outlined above has shown that inter-hoe differences, except in the abnormal case of the grain feed for hoe 3, are not of serious magnitude in this type of drill. Fluctuations along any particular row, however, are known to be considerable. This type of variation has been examined for lengths of row from 1 foot down to 1 inch by Engledow(3) for seed distribution, and various tests of fertilizer distributers using row-lengths of 1 foot and greater are on record.

In the present work an attempt to measure local fluctuations was made by using a length of row of 2 inches, this being the smallest compatible with any reasonable degree of accuracy under the prevailing conditions. It was necessary to carry out the tests in such a way that definite drill lines or rows could be located after using the implement. This was found impossible in an ordinary fallow. In an attempt to approach normal working conditions as closely as possible, a field pathway was roughly swept and a length of about 2 chains drilled along it, with fertilizer or grain running and the hoes penetrating only about ½ inch into the soil. As the pathway was uneven, it is considered that conditions approximated to those in a fallow in good tilth, as far as jolting of the implement and general working conditions other than wheel slippage are concerned. It appeared that the latter effect was negligible under these conditions. The implement was drawn by a pair of horses, as in normal working practice. After drilling in this way, the rows could be clearly picked

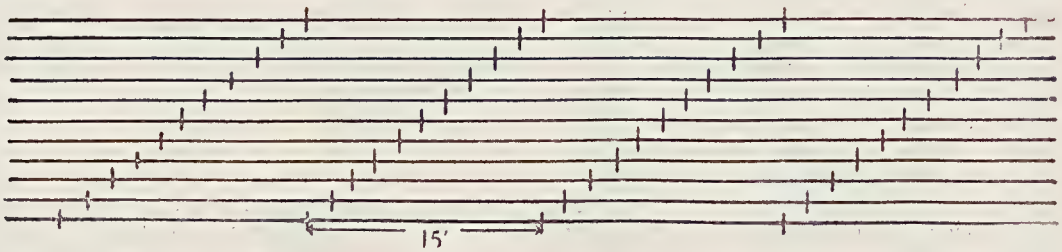


Fig. 2.—Showing arrangement of sampling points in test of distribution of superphosphate and wheat grain.

out, and it was possible to collect all the fertilizer or seed at any particular sampling point.

The hoes of this implement being spaced 7 inches apart, a rectangular sampling tool 7 inches x 2 inches was used to take samples, each representing 2 inches of row. The tool was centred on the particular row at the centre of the particular 2-in. section (see Figs. 2 and 3), and all the soil to below the depth stirred by the hoe was removed. In fertilizer tests, the amount of fertilizer in each sample was determined, and in grain tests numbers of grains in each section were counted. As inter-hoe differences were small compared with fluctuations along the rows, it was decided to adopt a systematic scatter system of sampling, putting equal numbers of sampling points on each row. This was done on a suitable section of the drilled strip, sufficiently far from the start to ensure that the drill was working normally. The method of spacing sampling points in the case of superphosphate is shown in Fig. 3, that for sulphate of ammonia being similar except that only 33 points were used—three on each row, points being 20 feet apart instead of 15 feet as shown in Fig. 3.

The above method was applied to the determination of the variation in application of sulphate of ammonia drilled together with superphosphate, this being of interest in connexion with other work. The application of superphosphate was also examined, and in this test wheat seed was sown at the same time.

(1) *Sulphate of Ammonia*—

This fertilizer is unlikely to be used to any extent under local conditions for cereals except as a mixture with superphosphate. The drilling qualities of such mixtures differ from those of sulphate of ammonia alone. On this account a test with a mixture sowing at the rate of ½ cwt. of sulphate of ammonia and 1 cwt. of superphosphate per acre was considered more useful than a test of sulphate of ammonia alone. As a mean of several preliminary tests it was found possible to sow the mixture at a rate corresponding to 56.3 lb. of sulphate of ammonia per acre.

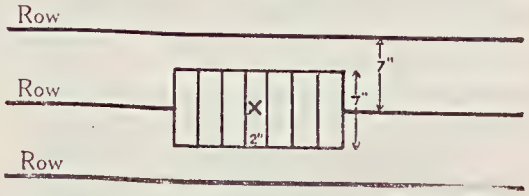


Fig. 3.—Showing area removed for examination at each sampling point. For fertilizer the marked rectangle only was investigated. For seed distribution seven sections centred by the marked section were examined.

After drilling as described, 33 soil samples were taken in the manner outlined above. Each sample was weighed and ammoniacal nitrogen determined in each by the method of McLean and Robinson(5). Several check samples were taken from outside the drill strip for estimation of ammoniacal nitrogen in the soil itself. This correction amounted to only 7 per cent. of the lowest value encountered, but was applied in all cases. It was then possible to calculate the amount of sulphate of ammonia distributed by the drill to each 2-in. section, using the known percentage of nitrogen in the fertilizer used. Rates of fertilizer application per acre corresponding to the amounts found in each 2-in. section of row were then calculated. These figures are set out as a distribution table in Table IV.

TABLE IV.—DISTRIBUTION OF RATES OF APPLICATION OF SULPHATE OF AMMONIA IN 2-IN. SECTIONS OF DRILL ROW.

—	Local Rate of Application—Pounds per acre.							
	0–20.	20–40.	40–60	60–80	80–100	100–120	120–140	140–160
Numbers of sections in each range	1	11	8	5	6	0	1	1
Numbers of sections in each range as percentage of total number	3	33	24	15	18	0	3	3

The average rate of application in the 2-in. sections sampled was 57.0 lb. per acre, a value very close to that given in preliminary trials. The lowest local application was at the rate of 14 lb. per acre, while the highest found corresponded to 143 lb. per acre. The high degree of variability is evident, the average deviation for a single 2-in. section being approximately 44 per cent. of the average application. In this case and in those following for superphosphate and wheat grain average deviation is given as an indication of variability instead of standard deviation, because of the nature of the distributions, which are asymmetric, with a tendency towards occasional wide fluctuation.

(2) *Superphosphate*—

In the manner described above, superphosphate of excellent drillability was sown, and samples taken as shown in Fig. 3 from 44 sections, scattered systematically and each representing 2-in. of row. Superphosphate was determined in each sample from the content of phosphoric acid soluble in 1 per cent. citric acid. The values obtained were all corrected for citric-soluble phosphoric acid in the soil itself, and the method was standardized on known amounts of superphosphate added to known amounts of the same soil. In this case the corrections for soil formed a considerable proportion of the total amount in the lowest values recorded. The distribution of local rates of application expressed as pounds per acre is shown in Table V.

Distribution is similar in character to that for sulphate of ammonia mixed with superphosphate. The mean rate of application calculated from the 44 determinations was 92.6 lb. per acre compared with an average rate of sowing of 108 lb. per acre in preliminary tests at the same setting. The highest and lowest local rates of application in the sections sampled were 17 and 322 lb. per acre respectively. In this case the average deviation for a single 2-in. section was approximately 57 per cent. of the mean application. Expressed as percentages of this mean, the values range from 18 to 348, compared with a range of 25 per cent. to 250 per cent. in the case of sulphate of ammonia. The sample of superphosphate used in this test was different from that mixed with the sulphate of ammonia.

TABLE V. — DISTRIBUTION OF RATES OF APPLICATION OF SUPERPHOSPHATE IN 2-IN. SECTIONS OF DRILL ROW.

—	Local Rate of Application—Pounds per acre.								
	0–40	40–80	80–120	120–160	160–200	200–240	240–280	280–320	320–360
Numbers of sections in each range ..	8	16	6	7	5	1	0	0	1
Numbers of sections in each range as percentage of total number ..	18	36	14	16	11	2	0	0	2

(3) *Wheat Grain*—

Wheat was sown at the same time as superphosphate in the test described above. From each of the samples for phosphate determination, wheat grains were removed and counted. In addition, counts were made of wheat grains in three sets of 2-in. sections on each side of each phosphate sampling point, as shown in Figure 4. There were thus 308 counts, which were distributed as shown in Table VI.

TABLE VI.—DISTRIBUTION OF WHEAT GRAINS IN 2-IN. SECTIONS OF ROW.

—	Number of Grains in Section.										
	0	1	2	3	4	5	6	7	8	9	10
Number of sections in each class ..	43	86	85	55	21	10	4	0	2	1	1
Number of sections in each class as percentages of total number.	14	28	28	18	7	3	1	0	1	0	0

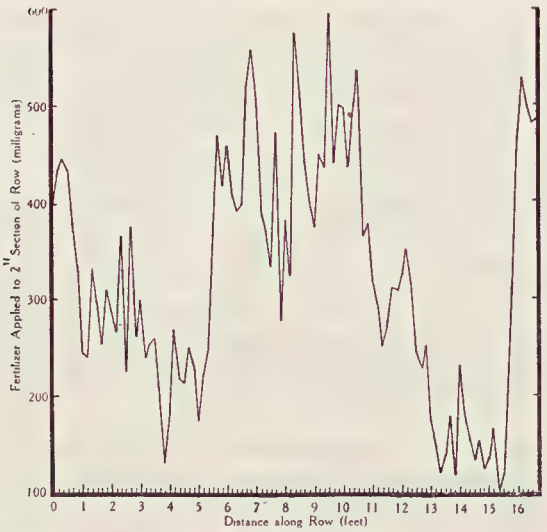


Fig. 4.—Showing variation in delivery of superphosphate to successive 2-inch sections of drill row.

The mean number of grains per 2-in. section was 1.99. The average deviation for a single 2-in. section was 1.11 grains, or 56 per cent. of the mean value. Preliminary tests with the same grain and the same setting, together with determinations of the weight per 100 grains of the seed used, showed that the average output of grain corresponding to 2 inches of row was 1.86 grains, corresponding to a total delivery of 80 lb. per acre.

In this test the low delivery from hoe 3 was again in evidence. The 28 sections examined on this row averaged only 0.97 grains per 2 inches of row, compared with the general average of 1.99.

As there were seven adjacent sections at each of 44 locations on the drill strip, it was possible to combine the grain counts to give 264 counts for 4-in. sections of row, and so on to 44 counts for 14-in. sections. The effect of combination in this way was quite similar to that obtained by Engledow(3). This, together with the general nature of the counts in successive 2-in. sections, was sufficient to warrant the application of Engledow's conclusions to description of the nature of local fluctuation in delivery of grain in the type of drill under investigation.

Simultaneous Delivery of Seed and Fertilizer.

The work described has shown that there are very considerable fluctuations in amounts of both seed and fertilizer in small sections of row. It was thought that jolting and vibration of the implement due to passage over surface irregularities and to unevenness in horse traction might give rise to a tendency towards simultaneous rise or fall in delivery of grain and fertilizer. This point was tested with the data from the drilling of wheat and superphosphate together. Such an effect should be revealed by the extent of correlation between delivery of seed and of fertilizer in each small section of row. Actually a correlation diagram for superphosphate and grain delivered to each of the 44 row lengths of 2 inches showed lack of correlation. This was confirmed by calculation of the correlation coefficient which was very small (0.035) and insignificant compared with its own standard error. There was thus no evidence of related variation under conditions of definite surface irregularity and of observed jerky traction. Changes in speed are known to play some part in fluctuation, and Davis(2) found that with an average speed with horses of 2 m.p.h., variations between 1.7 and 5.3 m.p.h. occurred, the higher rates being maintained only momentarily. The effect of such traction appears to be relatively slight for seed distribution and in the case of free-running fertilizer. It may be more important for fertilizer of sticky character.

It is of interest to examine the possible effect on efficiency of these largely independent fluctuations in seed and fertilizer delivery. It is evident that there must be considerable departure from the ideal distribution of regular amounts of both grain and fertilizer to each small section of row. From the data at hand it is possible to obtain a rough estimate of the extent to which the most inefficient combinations of seed and fertilizer are likely to occur. Such conditions are obviously those involving the association of large numbers of seed with small amounts of fertilizer and the application of large amounts of fertilizer to sections with no seed. With circumstances similar to those described for the above test with wheat, grain, and superphosphate, it appears that there is about one chance in 28 that a particular 2-in. section selected at random will have no seed and more than one and a half times the average application of fertilizer. Similarly there is about one chance in 32 for the association of four or more grains with less than half the average amount of fertilizer. Thus one or other of these two inefficient types of distribution may be expected in about one out of every fifteen

sections of row. On the other hand, approximately one section in three will contain either one, two, or three grains, and an amount of fertilizer between half and one and a half times the average application.

The chances of application of harmful amounts of concentrated fertilizer are comparatively small. For reasonably uniform distribution such materials have to be used in granular form, and preferably under conditions of relatively low humidity. Because of their concentrated character, their rate of application, for cereals at least, is not likely to greatly exceed 1 cwt. per acre. These considerations indicate that the degree of fluctuation in application of such materials under suitable conditions is likely to be comparable with that found for superphosphate and sulphate of ammonia. Using data from both these tests, it would appear that only one section of 2 inches of row in every thirteen will have more than twice the average amount of fertilizer. Setting the margin of safety, with regard to harmful effect on seed, for the use of a particular concentrated fertilizer at this arbitrary level of 2, with seeding conditions similar to those in the test described for superphosphate, the chances of injury are reduced to about one in fifteen, because in a certain proportion of sections there is no seed to suffer injury.

There are many accounts of the influence of fertilizers on germination and seedling growth, but much of the data is not applicable to conditions in a seed-bed. There is obvious difficulty in extending argument concerning small sections of row to lengths comparable with the size of seed. There is also difficulty in following the relationships in small sections under field conditions when plant growth is established. Spread of roots and diffusion effects then lead to inter-action with regard to seedling population and fertilizer concentration between adjacent sections of row and adjacent rows. Consideration of the degree of fluctuation in fertilizer application and the weather conditions at and following sowing, however, are of value in arriving at an understanding of certain varying effects in germination observed in field tests after drilling moderate average quantities of soluble fertilizer.

Nature and Causes of Fluctuation along Rows.

The conclusions of Engeldow(3) concerning fluctuation of grain distribution from implements of the type in universal use, and to which most Victorian drills conform, are that the distribution is virtually random, and that inconstancy of cup load is responsible for the major part of the variation. The design of the distributing mechanism is such that chaotic fluctuation is inherent in the delivery.

With fertilizer delivery of the kind under discussion, the nature of the mechanism is again responsible for most of the observed fluctuations in output of fertilizer of good drillability. In this case, however, the fluctuation is essentially cyclic in character, fertilizer being applied by the star type of distributer in definite pulses associated with the action of the individual points on the stars(6). The nature of the fluctuation for the drill used in the tests described above was observed by drawing the drill by hand over sheet metal from which the output of a particular hoe could be collected in successive sections along the row. Fig. 5 shows amounts of superphosphate obtained in this way from successive 2-in. sections of row over a total distance of about 16 feet. It is clear that the distribution consists of fluctuation of chaotic character super-imposed on periodic variation. Local fluctuations may cause considerable modification of output, especially at the higher levels, but the general nature of the distribution curve is determined by its cyclic character. In Fig. 5 only one complete cycle is shown, the amplitude being about 10 feet. This distance, namely, that travelled by the drill during the movement of one point on the star to the position occupied by its predecessor at the beginning of the cycle, is readily calculable from the speed-gear ratios of the implement at the particular setting employed, the circumference of the land wheel, and the number of points on the star. The rate of sowing of superphosphate in the test illustrated by Fig. 5 was considerably higher than 1 cwt., for which the amplitude of a cycle is about 20 feet. The range of variation in delivery to individual sections of row is also shown to be much lower at high than at low average rates of delivery.

The actual nature of the action of the star-points in the introduction of cyclic character into fertilizer output is due to the release of the bulk of the fertilizer carried between successive teeth soon after the backward edge of the moving point clears the offside end of the bottom-plate vent, a tendency counteracted to some extent by the shape of this delivery opening. There are other features of the usual design, such as the action of the

knocker, tending to give uniform flow, but the results show that there is much scope for improvement in this connexion. When the values shown in Fig. 5 are combined to give outputs per foot of row, most of the minor fluctuations are smoothed, and the periodic character becomes more evident, there being still a three-fold range between highest and lowest outputs per foot due to cyclic variation. When foot-lengths are considered, there is a series of more or less regular changes from peak to minimal delivery along each row, the distance between the two extreme types of output being about 10 feet for fertilizer of good drillability at the 1 cwt. setting of the implement used in these tests.

Phasing of the Stars.

Because of cylic distribution of fertilizer, opportunity for compensation of inefficient combination of grain and fertilizer in any small section of row by inter-action with neighbouring sections is limited. In the case of many seeds associated with minimum amount of fertilizer, the chances are that adjoining sections will also contain relatively small amounts of fertilizer. Some degree of compensation, and raising of general efficiency may be expected to follow careful phasing of the individual stars. Since the distribution from each star consists of pulses at intervals corresponding to several feet of travel, it would appear to be in the interests of efficiency to ensure that adjacent stars are not at peak delivery at the same time. Examination of a considerable number of drills has shown that little attention is given to this point. Several drills have been found in which three or four adjacent stars were practically in phase. Refinement in this regard is probably not justified while the general design remains as at present, but adjustment so that adjacent stars are definitely out of phase and alternate stars in phase should be simple and desirable.

Testing of Fertilizer Distribution for Plot Work.

Where accuracy in delivery of fertilizer is required, attention must be given to a number of factors. Divergences which may be obtained from an expected rate of application by fertilizer distributers are sometimes very wide(4). For plot work, the need for working with a standard, and preferably near the maximum, head of fertilizer in the box has been discussed. The influence of weather conditions on distribution may be important in accurate work. Investigation by Mehring and Cumings(6) has shown that relative humidity is the most important factor in this connexion. As an average of the results for fourteen fertilizers and mixtures, they show that output is diminished by about 3, 8, 20, 35, and 56 per cent. for changes in relative humidity from 40 to 50, 60, 70, 80, and 90 per cent. respectively. The extent of this effect for any particular fertilizer depends on its state of subdivision, hygroscopicity, &c. These investigators conclude that granular particles of 20-mesh size and approximately uniform in dimensions give the most satisfactory distribution with present machinery.

In view of the large effect on output of changes in relative humidity, it is of interest to examine the situation which would arise if, in order to save time at sowing, testing of a drill were carried out weeks before this critical period, to find appropriate gear ratios for distribution of specified quantities of particular fertilizers. Table 7 has been compiled from records of relative humidity at seventeen representative wheat-growing centres in Victoria. For access to these and other records the writer is indebted to Mr. H. Barkley, Assistant Director of the Commonwealth Meteorological Bureau. The figures presented are averaged from many years' records of monthly means for readings at 9 a.m. There is evidence that such figures give a fair representation of the mean daily relative humidity.

TABLE VII.—MEAN PERCENTAGE RELATIVE HUMIDITY FOR VICTORIAN WHEAT BELT.

January.	February.	March.	April.	May.	June.
50	53	60	69	79	86

Even when allowance is made for the large lag in adjustment of drilling properties to change in humidity, especially when the fertilizer is kept in bags, it is evident that satisfactory results could not be expected from a procedure involving determination of gear settings early in the year for use in May and June.

A somewhat similar prospect exists for variation during a working day. During a typical working day Mehring and Cumings(6) observed variations in delivery of ammonium phosphate of excellent drillability,

at constant setting of the implement, from 90.3 to 39.2 lb. per acre. Continuous recording relative humidity charts applicable to most of the Victorian wheat area show that changes in relative humidity from 90 to 50 per cent. are typical of variation during a working day at seed-time.

Another factor which must be considered in accurate work is that of wheel slippage. This depends largely on the state of the soil and the size and surface of the land wheels. Obviously such an effect causes lower output per acre of both seed and fertilizer in the field than is given by shed tests at the same settings. Determinations of the extent of this effect under local conditions have not been carried out, but the effect has been estimated at about 10 per cent. on the average for drills of the type to which local drills conform(6).

For work of precision, the only practicable method of testing output is to carry out the tests, with head of fertilizer regulated, on the actual location immediately prior to sowing. In this way, any special characters of the particular seed-bed as regards wheel slippage enter into the actual standardization of the implement. The drill should be run over a measured fraction of an acre as in normal operation, except that provision is made for catching the whole output, which may then be weighed. For a large series of plots, it may be desirable to check output during the drilling operations if relative humidity has changed to any notable extent. As a mean for six representative stations in the Victorian wheat belt there is a difference in relative humidity between 9 a.m. and 3 p.m. of about 20 per cent. for the months of April, May, and June.

The influence of certain other factors, such as slope of ground, on distribution has been described for grain(2) and fertilizer(6), and may warrant attention in special cases.

Summary.

In this report, variation in delivery from a drill is considered chiefly with regard to its incidence on experimental field plots. Certain factors contributing to fluctuation in delivery from a typical Victorian combined grain and fertilizer drill have been examined. The implement is a hoe drill with cup delivery of grain and star-type fertilizer distributers.

Differences in performance between individual hoes are similar to those reported abroad, except that an unusual degree of abnormality was detected in one of the grain sumps. The effect of head of grain in the hopper on output is negligible, but there is a definite effect in the case of fertilizer.

Variations between 2-in. sections of row scattered systematically over a drilled area covered a range of 25–250 per cent. of the mean delivery to such sections in the case of sulphate of ammonia applied at an average rate of ½ cwt. per acre and a range of 18–348 per cent. of the mean value for superphosphate at an average rate of 1 cwt. per acre. Both fertilizers were used in excellent drilling condition. For wheat grain of average size drilled at an average rate of 80 lb. per acre, variation between 0 and 10 grains was found in 2-in. sections of row.

The nature of seed distribution conforms with Engledow's conclusions(3) for drills of this type, namely, that the fluctuation is virtually random. The distribution of fertilizer was found to consist of random fluctuation superimposed upon periodic variation, associated with the action of individual points on the stars. Thus fertilizer output consists essentially of a series of cycles or pulses along each row, the amplitude being about 20 feet for an average delivery of approximately 1 cwt. per acre with the implement used. Attention is drawn to the necessity for phasing the stars so that adjacent rows are not receiving peak application at the same time.

There was no evidence of correlation between output of grain and fertilizer to individual 2-in. sections of row under the conditions of irregular movement characteristic of horse traction over an uneven surface.

The chances of occurrence of the most inefficient combinations of seed and fertilizer have been examined. There is roughly one chance in fifteen that any particular 2-in. section of row will have either no seed and more than one and a half times the average amount of fertilizer, or four or more seeds associated with less than half the average fertilizer application when wheat grain and superphosphate are sown at rates of about 80 lb. and 1 cwt. per acre respectively. The chances of more than double the average amount of fertilizer being applied to a 2-in. section containing seed under the same conditions are also about one in fifteen. Such a consideration has a bearing on the possible effect on germination and seedling growth of application of highly soluble fertilizer.

Recommendations for testing drills for plot work are given, with a discussion of the effect

of certain factors such as relative humidity on drill output, with particular reference to conditions in the Victorian wheat belt.

Acknowledgments.

The writer wishes to express his thanks to the officers of the State Farm, Rutherglen, especially Mr. H. L. Hore, and to the staff of the Agricultural Laboratory for assistance in this work, which has been carried on as opportunity offered since 1929.

References.

1. Crowther, E. M.—Annual Reports of the Progress of Applied Chemistry, 15, 1930, 483.
2. Davies, C.—Journ. S.E. Coll., Wye, 1931, No. 28, 243.
3. Engledow, F. L.—J. Agric. Science, 18, 1928, 1.
4. Keeble, F. W.—J. Min. Ag., 37, 1930, 439.
5. McLean, W., and Robinson, G. W.—J. Agric. Science, 24,1924, 548.
6. Mehring, A. L., and Cumings, G. A.—Tech. Bul., 182, U.S. Dept. Agric., 1930.
7. Technik, i.d., Landwirtschaft.—Dec.,1930, 321.

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(*c*) The owner or person in charge of the cattle shall deliver to the inspector a statutory declaration made by him to the effect that they have not been in contact with cattle affected with pleuro-pneumonia contagiosa.

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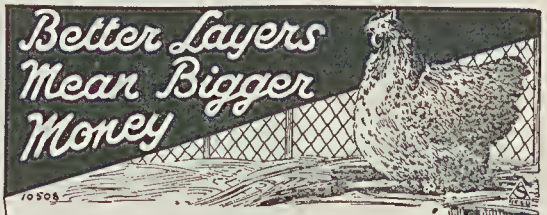

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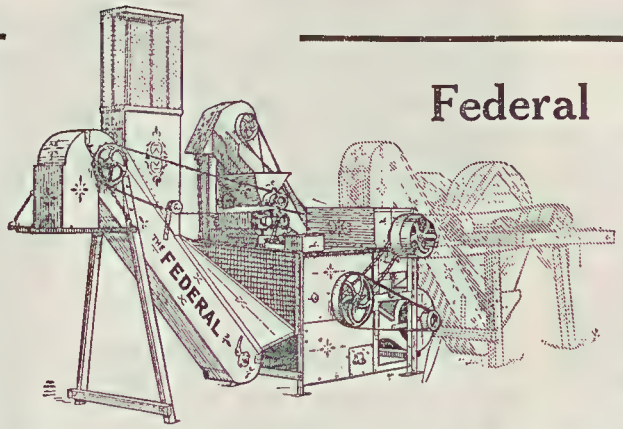

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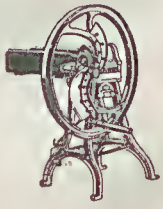

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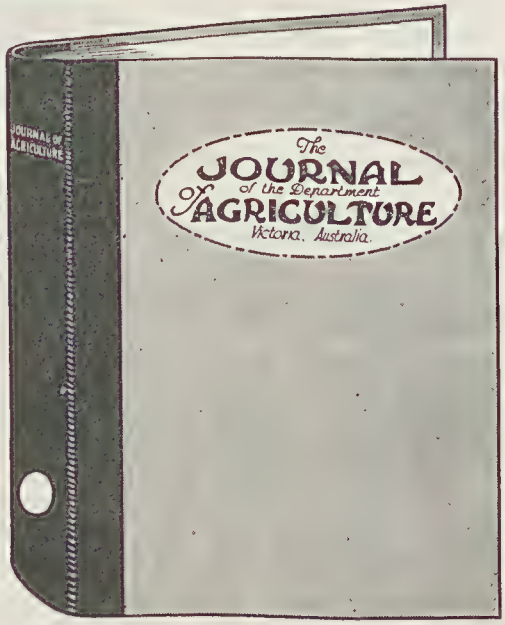

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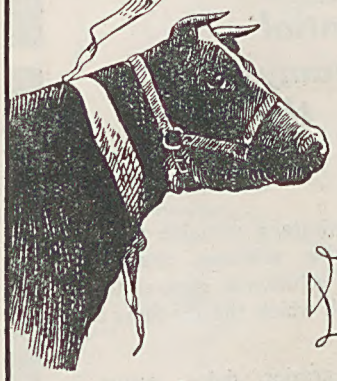

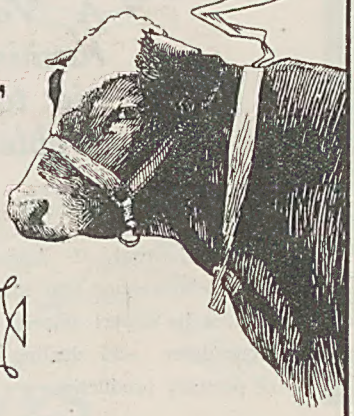

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